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A PATHOLOGICAL STUDY OF A CASE OF HYDROCEPHALUS.

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The following case is that of a hydrocephalic who lived to the age of 46 years. During his stay in the hospital he was practically an imbecile and had never been able to do any work. His history as given by his father records his advancement in school as far as the master's room (corresponding to the eighth grade) at the age of sixteen. The examination of the brain has been an attempt to homologize the surface anatomy with the normal, and following the work of Campbell one hemicerebrum has been studied to define the distribution and to compare the cell lamination and fiber arrangement of the various types of cortex.

The work was done in the laboratory of the Danvers Insane Hospital, Hathorne, Mass., during the months of January and February, 1907. The author wishes to express his thanks to Dr. E. E. Southard, Pathologist to the Danvers Hospital, for his direction, aid and suggestions and to Dr. Chas. W. Page, Superintendent of that institution, for the opportunity to work in the hospital laboratory.

HISTORY.

By Dr. H. M. Swift, Assistant Physician, Danvers Insane Hospital.

C. W. H. White male, æt. 45. Born in Salem, Mass., of American parents. Admitted to Danvers Insane Hospital October 13, 1905. Died January 24, 1906. Diagnosis: Imbecility (hydrocephalus).

Family History.—Father alive and well at the age of 76. Mother well. One brother living and well. One sister died at the age of three weeks. (Assigned cause, jaundice.)

Previous History.—Had all the diseases of childhood. Typhoid several years ago.

Has never used alcohol or tobacco. In school he went as far as the master's room but father does not think he was promoted every year. Left school at the age of sixteen and has never done any work since except errands around the house. Has always been ailing with some minor physical disability.

Present Illness.—He has never been allowed to go out of the house without an attendant; but on September 25 he left home unobserved and was gone all night, returning exhausted and unable to tell where he had been. Memory has been getting weaker of late years and he has shown signs of gradual mental degeneration. He has lately been more irritable and shows an increasing desire to get away from home. Never violent.

Physical Examination.

Examination by Dr. H. M. Swift.

Height, 5 feet 7 inches. Weight, 137 pounds. Poorly developed and poorly nourished. Head very large (circumference 25¼ inches). Face long, narrow and wedge-shaped. Right shoulder narrower and higher than left. Tendency to knock-knee.

Neurological Examination.

Neuromuscular Condition.—No swaying in Romberg's position. Gait fairly steady. Coarse tremor of fingers. Tongue protruded steadily and in the midline.

Vision and Hearing.—Apparently normal.

Reflexes.—Left pupil is slightly irregular and there is practically no reaction. Knee-jerks quite lively. Suggestion of clonus in left knee. Achilles brisk with slight clonus in both ankles. Arm reflexes very lively. Abdominal and cremasteric not marked.

Sensation.—Patient makes many mistakes in differentiating between sharp and dull points.

School Knowledge.—Repeats alphabet, names of the months and days of the week correctly. Counts one to 50 without error. Elementary arithmetic problems are for the most part wrongly

answered although there is some evidence of retention of knowledge in this particular. His handwriting when asked to write his name is a scrawl in which the name Charles and an occasional other letter all that is legible.

Appearance and Attitude.—Slow listless manner. Responds only to direct questions. Volunteers nothing. Sits by himself. Idle. Has to be urged to do anything. No interest in surroundings.

Speech.—Talks slowly. Test phrases repeated incorrectly.

Orientation.—Very poor. Thinks the year is 1870. Knows he is in a hospital but doesn't know what kind or where.

Hallucinations.—None evident.

Memory.—Practically no memory for recent or remote events.

Association.—There is considerable limitation in range of thought and lack of ideation.

Judgment.—No delusions. No insight.

Emotions.—Indifferent and apathetic. Occasionally slightly irritable.

Will.—No motor excitement or marked will disturbance.

Social Relations.—Quiet, tidy and orderly.

A few weeks before death the patient developed decubitus, ran a slight temperature and became stupid and lethargic.

Autopsy Record.

Autopsy six hours post mortem. January 24, 1906. Head, body and cord by Dr. E. E. Southard.

External Examination.—White male of middle height. Skull symmetrically enlarged, leaving face relatively small. Trunk and extremities of normal build. Body warm. Trace of lividity of dependent parts. No edema. Pupils not dilated. Abdominal subcutaneous fat 1.5 cm. thick.

Cavities of Trunk.—Normal. Mesenteric lymph nodes not palpable.

Heart.—Wt. 230 gms. Epicardium contains a moderate amount of fat. Myocardium firm and red. Endocardium and valves normal.

Spleen.—Wt. 105 gms. Capsule smooth. Substance firm and dark red. Trabeculæ normal or slightly increased. Malpighian bodies hard to make out.

Lungs.—Strikingly free from carbon markings. A few rounded collections of carbon in widely separated foci. Posterior parts of lungs edematous and congested. Left apex shows a smooth rounded fibrous capsule about 3 mm. deep under which the lung tissue is apparently normal. Bronchi and bronchial lymph nodes normal.

Gastrointestinal Tract.—Normal.

Pancreas.—Normal.

Liver.—Wt. 1050 gms. Normal.

Gall Bladder.—Single walnut-sized calculus. Wall normal, ducts patent.

Adrenals.—Normal.

Kidneys.—Wt. 220 gms. Strip well. Substance normal. Pelves and ureters normal.

Bladder and Prostate.—Normal.

Testes.—Thread well.

Aorta.—Shows slight sclerosis with puckering of arch.

Organs of Neck.—Normal.

Head.—Hair grey and thin. Scalp strips readily. Calvarium thin. No diploë. Dura not adherent to calvarium. Dura distended. Sinuses contain liquid blood. Arachnoid villi moderate in amount. Dura strips readily from pia except over ascending frontal gyri where, particularly on the left side, the dura and pia are gummed together by a plastic stringy yellowish-grey exudate, covering an area on each side scarcely larger than a dollar and thinning out gradually at the edges. There is no gross connection between this exudate and the otitis media of the right side. Except at the vertex the pia is without exudate or edema and shows a few fibrous streaks over sulcal veins. The substance of the brain, cerebellum, interbrain, pons and bulb, exclusive of the fluid contained in the ventricles, weighs 960 grams. The fluid withdrawn from the ventricles measures 1300 cc. The sulcation of the brain is rich but chiefly superficial. Many of the sulci run inwards for a few mm. and bend at right angles, assuming a position concentric with the hemisphere surface for a few mm. Incision of the ventricles and withdrawal of the contained clear fluid shows basal structures of a normal appearance but marked attenuation of the callosal and fornix tissue. The cerebellum is

of normal appearance and consistence. Lower structures grossly normal. The right middle ear contains semi-liquid yellowish-green pus communicating with a cavity 1.5 cm. in diameter in the mastoid process.

Anatomical Diagnoses.—Purulent otitis media; localized purulent leptomeningitis (vertex); congenital internal hydrocephalus; absence of diploë; slight aortic sclerosis; apical scar of left lung; edema and congestion of posterior parts of lungs; cholelithiasis.

Cultures from the left middle ear show Streptococcus pyogenes; from the right lung, Staphylococcus pyogenes aureus and a diphtheroid organism.

Microscopic Examination.

Heart.—One fasciculus shows a slight amount of fibrous replacement.

Lung.—Acute purulent bronchitis of the smaller divisions and bronchopneumonia. Little fibrin. The leucocytes are frequently phagocytic for pairs of cocci both flattened and lanceolate. Section from left apex shows dense fibrous tissue with lymph spaces containing granular material.

Spleen.—Engorged with blood. Pigmented cells frequent.

Liver.—Central cell columns narrowed, eosinophilic, in places pigmented. Central sinusoids injected. Pericellular spaces everywhere distinct and filled with granular coagulum. Characteristic picture of central atrophy with anilin blue stain. Considerable coarse vacuolation everywhere.

Pancreas.—Normal.

Adrenal.—Large collection of cells of the lymphocyte series. Numerous hyaline eosinophilic cells in adjacent columns.

Kidney.—Negative.

Testes.—Functionating slightly.

Thyroid.—Negative.

Parathyroid.—Fat-cells in central part. A few granular eosinophilic cells.

Hypophysis.—Large interlobular cysts. Large areas of fusiform green-pigmented cells in nerve portion. High proportion of eosinophilic cells in gland portion.

Material was taken from the right hemisphere for examination after various fixatives.

The left hemisphere was preserved entire in 10 per cent formalin and the following description and measurements are taken from it.

Measurements.

Hemisphere.—From frontal to occipital pole, 21 cm.; from temporal to occipital pole, 16 cm.; from highest point of vertex to lowest point of temporal lobe, 13 cm.; from median fissure to most prominent part of parietal lobe, 7 cm.

Lateral Ventricle.—Antero-posterior diameter, 19.5 cm.; vertical diameter over corpus striatum, 6.5 cm.; vertical diameter from bottom of temporal horn, 12 cm.

Lateral Diameter.—Mesial, 4 cm.; occipital, 5 cm.; frontal, 4 cm.

The more prominent fissures show on the internal surface as fairly definite ridges on the ventricular wall.

The interventricular communication is oval in outline with an antero-posterior diameter of 7 cm. and a vertical diameter of 5 cm.

The corpus callosum is stretched out as a thin band around this opening, having a length of 19 cm. from the anterior commissure to the lower border of the splenius. In thickness it varies considerably. The anterior and recurved portions and the anterior half of the superior part average 2 mm., while the remainder measures 1 mm. back as far as the splenius, which is about 2 mm. thick.

Fissures and Sulci.

The Sylvian Fissure, from the origin of its anterior branches (common trunk) to the posterior ascending ramus, measures 75 mm. The two anterior branches arise as a common trunk 4 mm. in length. The anterior ascending ramus passes upward from here 20 mm. The horizontal branch, after leaving the common trunk, passes forward 7 mm. and divides into short perpendicular arms. The superior arm runs upward and forward for 9 mm. to end on the third frontal gyrus. The lower arm passes downward 4 mm. over a superficial annectant and runs into one of the smaller fissures of the prefrontal region.

Posteriorly the Sylvian fissure bifurcates into an ascending and a descending limb (Fig. 1 *Sa* and *Sd*). The ascending branch runs upward and backward 13 mm., then turns forward at a right angle for a distance of 3 mm., then upward and backward through a curve of short radius for a distance of 10 mm., ending by a transverse branch each limb of which is 5 mm. in length. This sulcus (Fig. 1 *Sa*) is very shallow, barely indenting the gyri into which it runs. The descending branch (Fig. 1 *Sd*) runs downward for 5 mm., where it sends off two branches, an anterior passing downward 3 mm. into the superior temporal convolution and a posterior

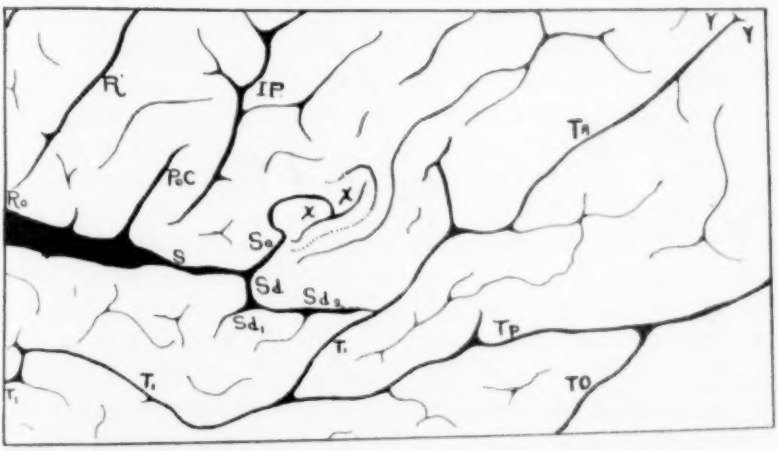

FIG. 1.—Projection outline of gyri and sulci. Sylvian region.

running backward parallel to the course of the major portion of the Sylvian for a distance of 12 mm., where it is interrupted by a narrow deep-set annectant between the adjacent parietal and temporal convolutions. Superficially the sulcus passes over the annectant, which is hidden by the surrounding gyri so that the fissure apparently fuses with the superior temporal sulcus.

There is a fissure 8 mm. in length and of fair depth beginning in the fissure of Sylvius and indenting the precentral convolution just anterior to the Rolandic operculum.

The Rolandic Fissure (Figs. 1 and 2 *R*) is 11.2 cm. in length and makes an angle of 65° with the great longitudinal fissure. It extends on to the mesial surface for 5 mm. and is separated from

the Sylvian fissure by an opercular gyrus 4 mm. in thickness. On spreading apart the borders of the fissure the lower parts of the precentral convolutions are seen to bulge into the space, encroaching on the postcentral. The site of the genu (Fig. 2 *Rg*) is marked by a short tributary sulcus 60 mm. below the mesial border, but the "great annectant buttress" of Campbell shows only as a low narrow ridge on the floor of the fissure.

The Precentral Sulcus is divided into a superior, median and inferior part.

The superior begins as a shallow groove on the mesial surface. On the lateral face it forms a tripartite figure each arm of which

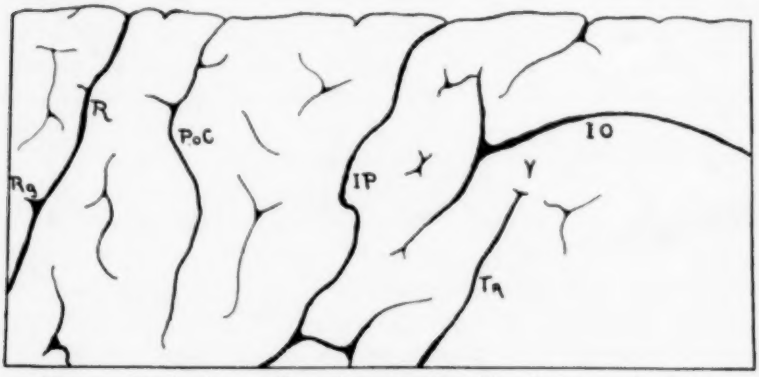

FIG. 2.—Projection outline of gyri and sulci. Postcentral region.

is about 10 mm. in length. The upper arm runs parallel to the central sulcus, the anterior passes forward parallel to the median fissure, while the third or descending ramus runs downward, curving slightly backward toward the Rolandic fissure.

The middle portion shows again three divergent arms. The upper arm begins just below the middle of the anterior arm of the superior portion, with which it has a shallow communication (probably a vascular groove and not a true sulcus), and runs downward roughly parallel to the fissure of Rolando for 18 mm., from which point the other two branches arise. The posterior branch passes backward and downward 23 mm. parallel to the posterior branch of the superior portion. The anterior runs forward and slightly downward, then bends slightly upward for 12 mm., where it ends in a shallow short perpendicular sulcus.

The inferior part begins 5 mm. below the point of junction of the three branches of the middle portion, runs downward, converging slightly toward the Rolandic fissure, for 25 mm., where it divides into two arms. The posterior arm—ramus sagittalis posterior—runs directly backward for 10 mm. to within 4 mm. of the central fissure.

The anterior or inferior arm passes downward and slightly forward for 7 mm., where it gives off a descending branch 20 mm. in length and bends forward at almost a right angle for 11 mm., then turns downward again for 15 mm., then backward and slightly downward, where, after receiving a short tributary, it again bends to run parallel to the fissure of Rolando, reaching the Sylvian fissure, into which it opens by a shallow channel over a narrow gyrus. A large branch arises from the forward bend of this sulcus and is continued forward as the medial frontal.

The Frontal Sulci are indefinite, owing to their shallowness, their ramifications and the flattening and broadening of the gyri and annectants.

The Sulcus Frontalis Medius is the most prominent; arising, as above noted, from the anterior arm of the inferior portion of the precentral, it runs forward and toward the mesial border for 35 mm., where it gives off a large branch which joins the ramifications of the superior frontal sulci. Here it is deflected downward for 7 mm., then continues forward for 25 mm. to its end.

The superior frontal sulcus is represented by a tangled maze of fairly deep, frequently interrupted, anastomosing sulci.

The Fronto-marginal Sulcus (Wernicke) shows two divisions. The posterior portion begins in the fossa of Sylvius and passes forward as a very shallow groove for 15 mm., where it bends slightly toward the lateral surface, deepens and becomes somewhat tortuous, continuing for 35 mm. to its terminus. At two points near its anterior end it is separated from the anterior portion by very narrow intervening gyri. The anterior part is a fairly deep, slightly wavy sulcus 27 mm. long running to a point within 4 mm. of the mesial border.

ORBITAL SURFACE.

The Olfactory Sulcus is 40 mm. long. At its posterior extremity it lies 13 mm. distant from the median fissure; but as it passes

forward it gradually converges and finally passes over on to the mesial surface, so that the last cm. is not visible from below.

The posterior arms of both the median and lateral orbital sulci and the sulcus cruciatus are well developed. The anterior arm of the median is 15 mm. long and ends in a sulcus bordering the first of three narrow convolutions grouped at the frontal pole, with their long axes roughly perpendicular to the longitudinal fissure. The anterior arm of the lateral sulcus is lost after a short distance in a tangle of shallow sulci running in a general way parallel to the fronto-marginal sulcus.

PARIETAL LOBE.

Postcentral.—The superior part of the postcentral sulcus is a continuation of the sulcus cinguli and extends on to the lateral surface as a deep incisure for 35 mm., diverging slightly from the Rolandic fissure.

The inferior portion of the postcentral is a cleft 20 mm. long beginning in the fissure of Sylvius 15 mm. behind the fissure of Rolando and parallel to the latter. No mesial portion is present, its place being taken by a diversion of the interparietal.

Interparietal (proprius) begins 5 mm. above Sylvian fissure and 20 mm. behind the fissure of Rolando. It runs upward in a curve of large radius, convex forward, for 53 mm., dividing into an anterior and a posterior branch. At the summit of the convexity it comes to within 10 mm. of the fissure of Rolando, to which it sends a deep collateral. The anterior branch runs forward and upward and ends on the superior part of the postcentral gyrus after a course of 10 mm. The posterior branch passes backward for 40 mm. parallel to the median fissure. Midway in its course it gives off an ascending branch (parietalis transversus) which runs parallel to the central fissure to reach the mesial surface, on which it descends 5 mm., then turns back at a right angle and continues for 15 mm. The posterior branch also gives off a shallow descending ramus at a point 7 mm. behind the origin of the transverse parietal. This branch passes downward for 20 mm., then bends backward to join an extension of the superior temporal sulcus described below. There is a deep sulcus beginning 5 mm. from the mesial border and running down roughly

parallel to the transverse parietal for 25 mm., representing the stipe and ramus of origin of the interoccipital (Wilder). From its mid-portion it gives origin to a perpendicular sulcus which runs backward over the occipital lobe for 6 cm., growing shallower as it progresses until it finally runs out into a shallow vascular groove. This sulcus is probably the homologue of the interoccipital (Fig. 2 *IO*) but is not continuous with the interparietal.

TEMPORAL LOBE.

Superior Temporal Sulcus (Fig. 1 T_1) begins on the lateral aspect a little behind the temporal pole and opposite the origin of the common trunk of the anterior ascending and horizontal rami of the fissure of Sylvius and runs backward parallel to the latter and about 5 mm. from it for 35 mm. Here it is offset by a superficial annectant to a position 2 mm. lower on the lateral surface, in which plane it continues for 15 mm., then returns to its original level and passes backward in an elongated S shape for 35 mm., where it divides into a superior or ascending and an inferior or posterior branch.

The superior or ascending arm (Figs. 1 and 2 *TA*) passes upward and backward roughly parallel to the Rolandic fissure for 90 mm., ending on the gyrus which forms the inferior boundary of the interoccipital sulcus. As it passes the end of the descending branch of the fissure of Sylvius it receives a superficial continuation therefrom. Its deeper portion is, however, distinct, owing to the interposition of a deep annectant between the superior temporal and parietal convolutions.

The posterior branch of the first temporal (Fig. 1 *TP*) passes backward in the general direction of the main trunk of the first temporal for 70 mm., ending on the flattened occipital lobe.

The Second Temporal Sulcus is represented anteriorly by short, shallow, irregular clefts with no definite arrangement.

The Third Temporal Sulcus probably has its homologue in a cleft 40 mm. in length running forward and inward from the temporo-occipital angle.

Arising from the tangle of sulci at the temporo-occipital angle is a deep sulcus 50 mm. in length running upward and slightly backward and terminating in the posterior branch of the first tem-

poral. This sulcus is probably the occipito-temporal of Lussana and gains in interest when the distribution of the cortex is considered. Its upper extremity (*TO*) and its anastomosis with the first temporal are shown in Fig. 1.

Except for these sulci the inferior surface and temporal pole are marked only by branching vascular grooves and show no division into gyri. One of these vascular grooves takes the position of the fissura rhinica and will be mentioned later in the description of the distribution of the pyriform lobule.

OCCIPITAL LOBE.

Except for the sulci described above as continuations of the parietal and temporal sulci the lateral surface of the occipital lobe shows no sulci.

The Lateral Occipital is 2 cm. in length and runs along the inferior margin of the lobe.

The Fissura Collateralis begins at a point on the inferior surface of the temporal lobe about 15 mm. behind the level of the posterior border of the crus cerebri and passes backward 35 mm., then deviates upward for a short curve, again resuming its original direction to end in the lateral occipital after a total course of 95 mm. Near the crest of its deviation it sends two short rami on to the mesial surface. The anterior of these two sends a branch forward to the anterior part of the common trunk of the calcarine and parieto-occipital.

MESIAL ASPECT.

The Sulcus Cinguli.—The anterior part begins at the "carrefour" of Broca and runs closely parallel to the corpus callosum for 9 cm., then gradually rises toward the superior margin, where it runs out on the mesial surface of one of the frontal gyri. Two cm. before its terminus it gives off a branch passing diagonally backward and downward to the median part, which begins opposite the point where the anterior portion diverges from the line parallel to the corpus callosum and runs backward to outline the paracentral lobule, where it turns upward, crossing the superior border, and becomes the superior part of the postcentral sulcus. The median division of the sulcus cinguli sends a branch down-

ward and backward, just before it turns to enclose the paracentral lobule, for a distance of 15 mm. This probably represents the posterior part of the sulcus cinguli.

The Sulcus Rostralis begins 3 mm. downward and forward from the point of origin of the anterior part of the sulcus cinguli and follows the latter closely at a distance of about 5 mm. with only one interruption for 9 cm. It sends several short rami forward, all of which end at or near the margin of the mesial surface.

The Paracentral Sulcus begins on the superior border of the precentral convolution, passes downward 10 mm., then turns sharply backward for 15 mm., ending within 5 mm. of the median part of the sulcus cinguli.

The Sulci Precunei are represented by one deep sulcus 35 mm. long and several shallow short branches.

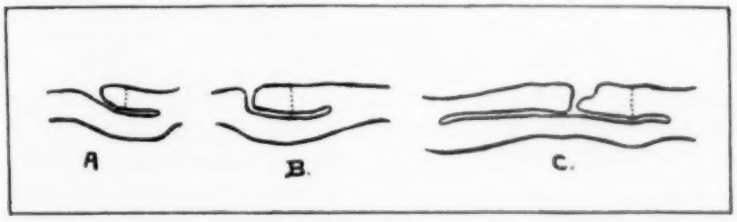

FIG. 3.—Diagram to illustrate angles of sulcal penetration.

The Common Trunk of the *Calcarine* and *Parieto-occipital* fissures (sulcus calcarinus proprius of Elliot Smith) arises in the plane of the splenium of the corpus callosum and passes backward and upward for 30 mm. to its division.

The Calcarine Fissure runs backward and downward for 70 mm., ending near the inferior border of the mesial aspect of the occipital pole in a transversely placed sulcus 8 mm. in length, the fissura extrema of Seitz or retrocalcarine fissure of Monakow.

The depth of the various fissures is more or less misleading, owing to the frequent occurrence of oblique direction of penetration (Fig. 3 *A*) or to angulation of their downward course. In many instances a sulcus passes directly inward only a few millimeters, then turns at an abrupt angle and continues parallel with the surface for some distance (Fig. 3 *B*). In other cases the

lower or parallel portion passes in both directions from the vertical trunk (Fig. 3 *C*). This latter condition seems generally dependent on the presence of two adjacent annectant buttresses, each encroaching on the opposite convolution and thus turning the parallel portion of the sulcus first in one direction and then the other, the line of section afterward passing through both arms. In a few instances, however, this double-angled figure is observable where such an explanation is not tenable.

The average depth of the main fissures and sulci has been measured, including both arms of the angle in such instances as Fig. 3 *C*. The appended table gives the depth in two columns, *i. e.*, the oblique or total penetration and the direct or actual distance from the top of the adjoining convolution to the deepest point reached by any part of the sulcus (Fig. 3, dotted lines). The first column is left vacant in those fissures whose direction is normal.

Fissure or Sulcus.	Average oblique penetration.	Average direct depth.
Sylvian. Mid-portion of posterior limb		To top of insular convolutions.. 1.75 mm. To bottom of insular sulci.... 2.5 mm.
Rolando	15 mm.	7 mm.
Precentral	8 mm.	5 mm.
Postcentral	7 mm.	5 mm.
Midfrontal	.....	5 mm.
Cinguli.		
Anterior branch	5 mm.	4 mm.
Median branch	15 mm.	5 mm.
Calcarine	10 mm.	2 mm.
Parieto-occipital	7 mm.	2 mm.
Interparietal	10 mm.	5 mm.
Interoccipital	10 mm.	1 mm.
Superior temporal	.....	10 mm.

Thickness of Brain Walls.

Plate II shows in general the relation of the size of the ventricular cavities to the walls.

The table below gives the average and maximal and minimal thickness of the walls in the various surfaces and borders of the different lobes.

Lobe.	Surface or Border.	Average thickness.	Maximal thickness.	Minimal thickness.
Frontal....	Lateral surface	11 mm.	14 mm.	9 mm.
	Mesial surface	10 mm.	13 mm.	7 mm.
	Orbital surface	10 mm.	15 mm.	9 mm.
	Superior border	19 mm.	20 mm.	17 mm.
	Inferior border	20 mm.	25 mm.	18 mm.
Parietal	Lateral surface	20 mm.	25 mm.	1 mm.
	Mesial surface	5 mm.	6 mm.	4 mm.
	Inferior surface:			
	Corpus striatum	30 mm.	35 mm.	20 mm.
	Superior border	15 mm.	20 mm.	10 mm.
Temporal...	Lateral surface	5 mm.	10 mm.	4 mm.
	Mesial surface	2 mm.	2 mm.	2 mm.
	Inferior surface	3 mm.	5 mm.	1 mm.
Occipital....	Lateral surface	5 mm.	7 mm.	2 mm.
	Mesial surface	5 mm.	7 mm.	3 mm.
	Inferior surface	6 mm.	8 mm.	2 mm.

Plate II shows a series of sixteen sections, averaging 13 mm. in thickness, through the left hemisphere. The corpus striatum first appears about the middle of the fourth section, *i. e.*, approximately 45 mm. from the frontal pole. The usual relation of the caudate and lenticular nuclei is observed. At the beginning of the fifth section the corpus striatum is 13 mm. in thickness. The major part is made up of caudate nucleus, which is separated from the lenticular by a line of isolated bundles representing the first view of the internal capsule.

The sixth section (Fig. 4) shows a well-defined internal capsule. The total width of the corpus striatum here is 20 mm., of which 12 mm. is lenticular nucleus, 4 mm. is caudate nucleus, the remaining 4 mm. being occupied by the capsule. The caudate has moved slightly upward and outward. The optic thalamus begins about the middle of this section and runs to the middle of the next.

In the seventh section the lenticular nucleus has disappeared and the caudate is represented by an elongated patch 1 mm. thick by 5 mm. long above the thalamus, which is 10 mm. in greatest width. This section includes the corpora mammillaria and most of the crus cerebri.

The next section (No. 8) contains the hinder part of the crus and passes through the communication into the temporal horn of the ventricle.

The island of Reil is first seen in the third section and continues back as far as the ninth. It is considerably flattened but through it is the thickest amount of cerebral substance.

GYRI.

In general it may be said that the gyral width is proportionate to the degree of attenuation of the cerebral wall. Thus the prefrontal and orbital gyri are of approximately normal width. Such

FIG. 4.—Photograph of Section 6, Plate II.

gyri as are outlined on the occipital and temporal lobes are considerably widened, while the lateral convolutions show variations following roughly the same rule. Those which pass up over the mesial border, *e. g.*, the pre- and postcentrals, are broader on the convex surface and narrow as they approach the thicker portions near the border.

The precentral convolution reaches a width of 25 mm. in places, while the postcentral is proportionately wide. On the mesial surface the continuations of these gyri forming the paracentral lobule are considerably less broad, averaging 10 mm.

The limbic lobe is about 10 mm. in width anteriorly, broadening to 15 mm. as it passes backward.

In many places the wider convolutions show a tendency toward the formation of superficial indentations or abortive sulci, to which Wilder has applied the name fossulæ. These show, however, on microscopic examination, merely as depressions, and not as true divisions of the cortical matter, as do some of the vascular grooves of the occipital and temporal lobes which will be described later.

The two limbs *XX* at the end of the posterior ascending limb of the fissure of Sylvius (Fig. 1) are very shallow, and the portion outlined by dotted lines may be taken to represent the supramarginal convolution.

Figs. 1 and 2 *Y* represent the angular gyrus, which in this instance is high on the convexity.

The superior temporal gyrus is narrow anteriorly, broadening as it passes backward, a condition which is explained by the prolongation into it of a widened ventricular cleft (Fig. 6) and which proves of interest in connection with the distribution of the audito-sensory type of cortex.

On opening the fourth ventricle it is seen to be of about normal size. Its ependyma is smooth but on section appears irregularly thickened. The aqueduct of Sylvius is entirely obliterated as far as can be seen by gross examination, at about its mid-portion, by a firm partition crossing it at right angles to its long axis. Behind this obstruction the canal is of about its usual diameter, while in front its walls diverge sharply to open into the widely dilated third ventricle. Sections of this partition stained by Mallory's original neuroglia method (mordanting in ammonium bichromate and picric acid and staining with phosphotungstic acid hematein after formaldehyde fixation) show it to be made up entirely of close-meshed neuroglia network containing many glia cells, some of which are multinucleated, and several small canals lined with cuboidal ependyma-like cells, some of which show cilia. Serial sections were cut from a paraffin block of that portion of this area lying to one side of the median line and the course of all of these canals traced. The majority of them passed in short distances to end blindly, but a few, and in every instance these were the wider

ones, opened out both ways—anteriorly into the aqueduct in front of the obstruction and posteriorly into the fourth ventricle, thus forming a direct channel of communication past the obliterating partition.

The surrounding tissues near the lesion show a well marked neuroglia increase. The choroid plexus of the fourth ventricle is normal. The foramina of Magendie and of Key and Retzius are patent. The cerebellum is normal both to gross and microscopic examination. Sections of the cord from the fourth cervical, second dorsal, third lumbar and first sacral regions, stained by the Nissl, Weigert and phosphotungstic acid hematein methods for the display of the cells, fibers and neuroglia, show no abnormalities except an occasional eccentric nucleus in an anterior horn cell.

The anterior choroid plexuses show many concentrically layered hyaline bodies and few villi.

The cells of the caudate and lenticular nuclei are normal in morphology and distribution.

The microscopic examination of the cerebral cortex will be taken up in detail but a general description is here included. The cortical picture from all regions is one of intense cell richness. This is more marked in the areas where the distension has been most active, *i. e.*, where the wall is thinnest, but is evident enough to be noticeable at first glance everywhere. The pia over the frontal cortex in the region of the exudate mentioned in the gross description shows numerous polymorphonuclear leucocytes and also many large mononuclear cells, some of which are phagocytic for the leucocytes. Neuroglial reaction beneath the pia is evidenced by swollen cell bodies and multiple nuclei.

Phosphotungstic acid hematein stains of various cortical areas show a diffuse fine fibrillar neuroglia meshwork of fairly uniform distribution but in general thicker beneath the pia and at the bottom of the sulci. In some areas the gliosis is quite marked but these will be mentioned in the later description of the cortex.

The ependyma of the lateral and third ventricles is everywhere smooth and shows no nodular glial elevations. The ependymal lining consists of flattened cells very few of which show cilia.

At many places beneath the ependyma are collections of small hyaline globules in irregular clusters or lined up along the blood-vessels.

In order to determine more definitely the cell changes and fiber variations of the different types of cortex and to outline the distribution of the various fields, sections were taken from the various border line areas and from the centers of fields of the left hemicerebrum and compared with Campbell's charts and descriptions. The cell studies were made after celloidin embedding (20-micron sections) and staining in ¼ of 1 per cent aqueous solution of thionin. The fibers were stained by the Weigert process in 30-micron celloidin sections. Phosphotungstic acid hematein stain was used for neuroglia in places where changes were indicated.

No attempt was made to section the entire cerebral cortex, but sections were taken from the centers of the fields to serve for a description of types and other blocks were cut along the border lines or boundaries of the normal distribution of cortical variations. In some instances these had to be supplemented by additional pieces, but by this method a fairly accurate outline of the distribution was reached and oblique sections were more readily avoided. Occasionally one block was cut long enough to show three types but as a rule they served to overlap the junction of two only. In this way 224 blocks sufficed to limit the fields.

In the following account of the cell lamination and fiber arrangement Campbell's descriptions and classification have been closely followed though reference has also been had to the work of S. Ramón y Cajal, Hammarberg, Kaes and others. In comparing cell sizes in various areas, *viz.*, the Betz cells as compared with the large pyramidals of the postcentral convolutions, the camera lucida has been employed. At first numerous cells from each field were drawn and the drawings compared; but a more rapid and easier method was finally adopted, *i. e.*, that of drawing a number of typical cells of one area on a sheet of paper and then superimposing, at the same magnification, the image of the cells in another zone onto the copied outline of the first. The outline can be heavily inked and the work of comparison of size and shape is thus greatly facilitated.

Precentral Cortex.

Fiber arrangement.

1. *Zonal Layer.*—Contains fibers of the small and large varicose and evenly medullated medium-sized types in that order of frequency, the last-named being rather few in number.

2. *Supraradiary Field.*—Rich network of fine fibrils. No larger fibers found.

3. *Line of Baillarger.*—Not very definite. There are many fine fibrils and a few coarser ones in this position, but they can scarcely be said to form a definite line and they fuse below with the interradiary plexus.

4. *Radiations of Meynert.*—These bundles are very strong. They show from one to three large varicose fibrils and an occasional evenly medullated fiber of large size in a dense bundle of fine fibers. The radiations pierce the position of the line of Baillarger and enter the supraradiary field.

5. *Interradiary Plexus.*—Rich network of fine varicose fibrils.

6. *Association Fibers.*—Large transverse and oblique fibers well represented.

CELL LAMINATION.

1. *Plexiform Layer.*—This layer is thick in the motor cortex and its width serves as one of the differentiating points from the surrounding types. It contains many small round and oval cells and occasionally one of the fusiform shape with its long axis parallel to the gyral surface.

2 and 3. *Layers of Small and Medium-Sized Pyramidal Cells.*—These lamina can not be separated into their two parts. The layer consists of intermingled cells of the two sizes, only about one-half of which show differentiation into a pyramidal form.

4. *External Layer of Large Pyramidal Cells.*—Distinct lamina. Cells large and show an abundance of chromophilic particles. Some are pyknotic.

5. *Layer of Stellate Cells.*—Irregular in width but recognizable everywhere. Few small pyramidals scattered among the stellates.

6. *Internal Layer of Large Pyramidal Cells.*—The large pyramidals of this layer are not so large as those of the external layer. The Betz cells are typical as regards size, morphology and position, except that an occasional cell conforming to the Betz type is found in or even above the stellate layer. Some of the Betz cells are pyknotic.

7. *Layer of Fusiform Cells.*—Fairly deep and contains many spindle-shaped and small pyramidal cells and about an equal number of undifferentiated cells.

DISTRIBUTION.

Mesial Surface.—The anterior and lower borders of the motor cortex on the mesial surface are marked sharply by the paracentral sulcus. The posterior border is roughly speaking a line drawn from the mesial end of the fissure of Rolando to the lower end of the paracentral sulcus.

Lateral Surface.—The fissure of Rolando serves to define the motor area posteriorly. The oblique direction of penetration is followed closely by the cortical distribution. Thus the change from precentral to postcentral type can be made out as taking place at the bottom of the fissure, which is in some places 5 to 10 mm. behind its position on the surface, the motor type underlying the sulcus with cortex of postcentral structure above it. The annectant buttress at the level of the genu shows a structure which places it in the motor field but its differentiation is imperfect and parallels its anatomical development. It contains a very few cells towards its anterior end which may be regarded as Betz cells.

The anterior boundary of the precentral area is followed with difficulty. At the mesial border it is limited by the paracentral sulcus and from here it widens out forward covering three-fourths of the precentral gyrus along the distribution of the superior division of the precentral sulcus. Along the length of the superior ramus of the middle division it covers half of the field between the latter and the fissure of Rolando, continuing as a belt of about even width enveloping the ramus sagittalis posterior and reaching forward to the anterior branch of the first bifurcation of the inferior division of the sulcus precentralis and its descending branch. From this point the breadth of the motor "skirt" diminishes rapidly, ending about 8 mm. above the lower end of the fissure of Rolando.

Postcentral Cortex.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Fewer fibers of all types, and notably of the larger sizes, than the precentral. The layer is also considerably narrower than that covering the motor field.

2. *Supraradiary Zone.*—Fairly rich tangle of fine fibers. Occasionally a horizontal varicose fiber of medium size.

3. *Line of Baillarger.*—Poorly represented. Fine fibrils running in all directions.

4. *Radiations of Meynert.*—Not so strong as in the precentral area. Made up chiefly of small fibers and only a few very large ones.

5. *Interradiary Plexus.*—Rich but markedly less so than in precentral.

6. *Association Fibers.*—Many and large and running in all directions, though chiefly horizontally.

CELL LAMINATION.

1. *Plexiform.*—Cell content less rich than in precentral cortex but of much the same type.

2. *Layer of Small Pyramidal Cells.*—Thick closely packed layer of small cells, not more than one in twenty of which shows a pyramidal form.

3. *Layer of Medium-Sized Pyramidal Cells.*—Cells better differentiated.

4. *External Layer of Large Pyramidal Cells.*—Many large cells but appreciably smaller by camera-lucida comparison than the homologous cells of the motor cortex. Numerous smaller pyramidals scattered through this layer.

5. *Layer of Stellate Cells.*—Wide and thickly packed with poorly differentiated cells.

6. *Internal Layer of Large Pyramidal Cells.*—Many giant cells, but measurably smaller than the Betz cells. Many large pyramidals.

7. *Layer of Fusiform Cells.*—Layer fairly deep. Much like precentral in type.

DISTRIBUTION.

Mesial Surface.—On the paracentral lobule the postcentral type of cortex forms a rough parallelogram about 6 mm. wide, limited anteriorly by the line given above as the posterior boundary of the precentral type.

Lateral Surface.—Here the cortex bearing this structure forms a gradually narrowing band, occupying approximately half of the postcentral gyrus and ending about 10 mm. above the lowest point reached by the motor type.

Visuosensory or Calcarine Cortex.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Rather narrow. Numerous small varicose fibrils. Few evenly medullated medium-sized fibers. No coarse varicose.

2. *Supraradiary Layer.*—Rich network of fine varicose fibrils. The radiations of Meynert extend into this field as quite prominent bundles.

3. *Line of Gennari (or Vicq d'Azyr)* is an exceedingly rich band of longitudinally placed fine fibrils through which can be plainly seen the thick radiary bundles.

4. *Radiations of Meynert.*—Thick groups of fibers in which the fine varicose type predominates. The large evenly medullated fibers are numerous. Coarse varicose fibers are rather few.

5. *Interradiary Plexus.*—Well developed and consisting of numerous fine fibrils of a fairly uniform size throughout. No definite pallid lamina can be made out beneath the line of Gennari.

6. *Association Fibers.*—Many horizontal evenly medullated fibers of large caliber.

CELL LAMINATION.

1. *Plexiform Layer.*—Contains practically no differentiated cells. Chiefly oval nuclei with no protoplasm.

2. *Layer of Small Pyramidal Cells.*—Cells imperfectly developed. Not more than one cell out of a dozen shows a pyramidal outline. For the most part they are small oval nuclei, with little or no protoplasm.

3. *Layer of Medium-Sized Pyramidal Cells.*—Shows considerably better differentiation than last layer.

4. *Layer of Large Stellate Cells.*—Fairly numerous and typical.

5. *Layer of Small Stellate Cells.*—Close-packed and fairly well differentiated.

6. *Layer of Small Pyramidal Cells with an Ascending Axis-Cylinder.*—Few and with difficulty separated from lower layer.

7. *Layer of Giant Pyramidal Cells (Solitary Cells of Meynert).*—Few in number but typical in morphology. Rarely more than one in a low-power field.

8. *Layer of Medium-Sized Pyramidal Cells.*—Fairly numerous and well developed.

9. *Layer of Fusiform Cells.*—Numerous fusiform and a few triangular cells. Almost all lie with their long axes parallel to the ventricular surface.

DISTRIBUTION.

The calcarine type of cortex begins as a narrow band beneath the stem of the calcarine and parieto-occipital fissures (the calcarinus proprius of Elliot Smith), and passes backward in a widening band without crossing the fissure, except by the underfolding due to the oblique penetration, as far as its point of division. Along this common trunk is one of the places where a double deflection of the bottom of the fissure has occurred (Fig. 3 *C*), and the calcarine type of cortex is here found to envelop one arm completely and end opposite the bottom of the second, thus seemingly indicating the latter as the original sulcal fundus. At the point of origin of the calcarine and parieto-occipital fissures the visuosensory cortex crosses the former and its upper border runs backward and slightly downward to within 10 mm. of the occipital pole, where it turns sharply downward to and around the inferior margin. The scarcity of sulci on this surface renders difficult a descriptive outline, but in general the field may be said to have a rough pyriform shape with its narrow end bent slightly downward to conform to the course of the calcarine stem. Its lower portion passes the inferior angle and appears as a small patch on the lateral surface, but on the inferior aspect instead of the pole, as Campbell plots it. This downward displacement of the field is probably the result of disproportionate distension of the overlying occipital and occipito-parietal portions.

Visuopsychic Cortex.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Many small varicose fibers. No fibers of larger caliber.

2. *Supraradiary Zone.*—Chiefly small fibers. Occasional coarse fiber extending up from the radiations. Numerous fibers, both

fine and course, are seen running transversely, but they are not compact enough to form a definite line of Kaes.

3. *Line of Baillarger.*—Poorly marked. In thick sections an indefinite, frequently interrupted wide band can be made out. Consists of a few medium-sized varicose fibers and many smaller ones. Upper and lower boundaries indefinite.

4. *Radiations of Meynert.*—Definite but not nearly so well marked as in the calcarine. Practically every radiation contains one, sometimes two, large varicose fibers, a bundle of small fibrils and an occasional evenly medullated medium-sized fiber.

5. *Interradiary Plexus.*—Many fine fibrils running in all directions.

6. *Association Fibers.*—Numerous. Coarse fibers chiefly horizontal or slightly oblique in direction.

CELL LAMINATION.

1. *Plexiform Layer.*—Very much like visuosensory cortex except that the layer is much thicker.

2. *Layer of Small Pyramidal Cells.*—Very much like the same layer in the calcarine cortex.

3. *Layer of Medium-Sized Pyramidal Cells.*—The layer is better differentiated. The pyramidal contours and the beginning of basal processes can be made out in fully half of the cells.

4. *External Layer of Large Pyramidal Cells.*—Well shown. Many cells of fairly large size with well developed basal processes. Some of the larger show a few small chromophilic particles. Some are pyknotic. The sharp demarcation of this layer of cells serves to distinguish this type of cortex from the calcarine very readily in sections stained for the cells. In the fiber preparations the broad line of Baillarger answers equally well and the two are found to be very exactly coincident.

5. *Layer of Stellate Cells.*—This layer is very much like the second stellate layer of the calcarine zone.

6. *Internal Layer of Large Pyramidal Cells.*—Fairly well shown. Cells not so large as those of the external lamina and interspersed with many small pyramidals. Near the border of the visuosensory cortex an occasional solitary giant cell is found in cortex which otherwise bears visuopsychic characteristics.

7. *Layer of Fusiform Cells.*—Not remarkable.

DISTRIBUTION.

Mesial Surface.—Below the calcarine cortex the visuopsychic type begins near the anterior end of the calcarine stem and passes backward as a band about 10 mm. wide, broadening to 20 mm. beneath the point of division of this fissure, again shrinking to 10 mm. as it turns downward to cross the lower boundary. In its course it comes in relation with the fissura collateralis and is in part limited by it. The anterior extension of this field beneath the calcarine stem could not be exactly determined on account of the very gradual transition here to the type of common temporal. This area is shown on the diagram by mixed short lines and dots. Above the calcarine field the visuopsychic type occupies the remainder of the cuneus.

Lateral Surface.—On this aspect the visuopsychic cortex covers all of the occipital pole except the small area described for the calcarine and extends as far forward as the sulcus which has been mentioned in the gross description as the occipito-temporal of Lussana. The demarcation of this field is very sharp along the sulcus and its relationship will be more fully discussed later.

Audito-Sensory Cortex.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Many fine varicose fibrils and fairly numerous large varicose fibers.

2. *Supraradiary Zone.*—Fiber content not rich. Chiefly small fibers. Some medium-sized varicose fibrils running in a horizontal direction which are numerous enough so that in sections of 30 microns or over a line of Kaes can be recognized.

3. *Line of Baillarger.*—A wide poorly demarcated zone of only slightly greater fiber wealth than the subjacent layer. Chiefly small varicose fibrils.

4. *Radiations of Meynert.*—Short, fairly thick bundles with numerous medium-sized varicose fibers and many small fibrils.

5. *Interradiary Plexus.*—Rich network of small fibrils.

6. *Association Fibers.*—Many large horizontal and oblique fibers.

CELL LAMINATION.

1. *Plexiform Layer.*—Contains an occasional small fusiform cell.

2 and 3. *Layers of Small and Medium-Sized Cells.*—These layers can not be separated. The variations in cell size are slight and they maintain no definite laminate assortment. The cells are rather poorly differentiated.

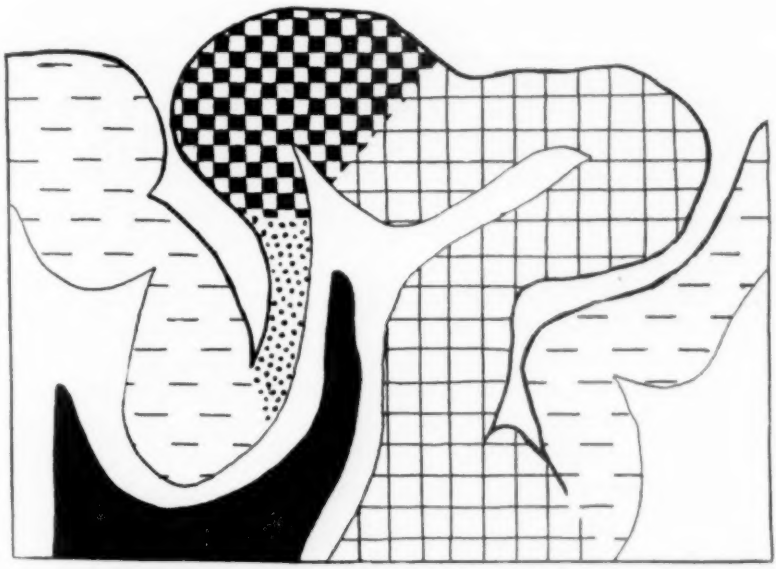

FIG. 5.—Diagram of cortical arrangement through the temporal horn of the lateral ventricle.

4. *External Layer of Large Pyramidal Cells.*—Very few undifferentiated cells. Giant cells numerous, usually two or three in each low-power field. Basal and apical processes strong. Chromophilic particles large and numerous. Some of these cells are pyknotic and their size is only slightly less than that of the Betz cells of the motor cortex.

5. *Layer of Stellate Cells.*—Narrow layer, rich in cells.

6. *Internal Layer of Large Pyramidal Cells.*—Many pyramidal cells of medium size but few large ones.

7. *Layer of Fusiform Cells.*—Fairly deep lamina. Many fusiform cells, the lower of which show a tendency to lie with their long axes parallel to the ventricular wall.

DISTRIBUTION.

The audito-sensory cortex has a distribution which calls for special explanation. Instead of being entirely concealed within the fissure of Sylvius and occupying its inferior wall as Campbell locates it, cortex which is undoubtedly of the audito-sensory type is found extending out on to the lateral surface of the superior temporal convolution for a distance, in places, of 10 mm. This is explained by a transverse section through the region (Fig. 5), which shows a narrow bay-like extension of the ventricular cavity. This cavity comes very close to the surface along the inferior Sylvian wall, and at this point the cortex shows a very low degree of differentiation and can not be classified. Above, on the superior surface of the first temporal gyrus, is audito-sensory cortex which has been turned out, as it were, from the Sylvian wall. Anteriorly this type of cortex is found as far forward as the opercle of the precentral gyrus, while posteriorly it extends to within 6 mm. of the point of bifurcation of the Sylvian.

AUDITO-PSYCHIC.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Numerous small varicose fibrils.

2. *Supraradiary Zone.*—Few fine, irregularly placed varicose fibers. Few long evenly medullated fibers in a position to suggest a line of Kaes. Radial prolongations fairly definite.

3. *Line of Baillarger.*—Ill-defined. Fibers forming it are of the small varicose type and widely separated.

4. *Radiations of Meynert.*—Closely set but rather poor. Consist of a few medium-sized varicose fibers in a group of finer ones. Extend into supraradiary field.

5. *Interradiary Plexus.*—Markedly less prominent than in audito-sensory area.

6. *Association Fibers.*—Coarse horizontal fibers, few in number.

CELL LAMINATION.

1. *Plexiform Layer.*—Same as audito-sensory.

2 and 3. *Layer of Small and Intermediary Pyramidal Cells.*—Slightly more laminate assortment than in audito-sensory, but contains a less number of differentiated cells.

4. *External Layer of Large Pyramidal Cells.*—Giant cells scarce and measurably smaller than in foregoing type. Large pyramidals fairly numerous.

5. *Layer of Stellate Cells.*—About like audito-sensory area, but arranged in columns to accommodate the radiations.

6. *Internal Layer of Large Pyramidal Cells.*—Contains few large cells. Medium-sized pyramidals numerous. This layer is not well demarcated from that below.

7. *Layer of Fusiform Cells.*—Numerous and thickly packed.

DISTRIBUTION.

This type of cortex is found covering all of the first temporal convolution back of a point 10 mm. behind the junction of the precentral sulcus with the fissure of Sylvius, to the upturned end of the first temporal sulcus, except that occupied by audito-sensory. The deep annectant between the parietal convolutions and the first temporal, which really cuts off the fissure of Sylvius, is found to bear features common to both the audito-psychic and common temporal types, but should probably really be classed with the former.

COMMON TEMPORAL.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Very few fine fibers. None of larger caliber.

2. *Supraradiary Zone.*—Outer layers have only a very few delicate fibers. Lower contain a very poor meshwork of fine fibers. No line of Kaes.

3. *Line of Baillarger.*—Few fine fibers with a horizontal direction. Scarcely recognizable.

4. *Radiations of Meynert.*—Poor. Chiefly fine fibrils. Only an occasional medium-sized fiber and no larger ones.

5. *Interradiary Plexus.*—Very few fine fibrils.

6. *Association Fibers.*—Sparse and small in size.

CELL LAMINATION.

1. *Plexiform Layer.*—Like other temporals, but less thick.

2 and 3. *Layer of Small and Medium-Sized Pyramidal Cells.*—Not separable. Very poor differentiation.

4. *External Layer of Large Pyramidal Cells.*—No giant cells. Large cells definitely smaller than audito-psychic and rather few in number.

5. *Layer of Stellate Cells.*—Narrow and ill-defined.

6. *Internal Layer of Large Pyramidal Cells.*—Cells of this type are rather few, their place being occupied by oval nuclei with little protoplasm.

7. *Layer of Fusiform Cells.*—Few fusiform and occasionally a triangular cell.

DISTRIBUTION.

Lateral Aspect.—The common temporal type of cortex covers all of the lateral face of the temporal lobe, except that portion of the first temporal convolution already described under the audito-sensory and audito-psychic areas. Posteriorly it is bounded by the occipito-temporal sulcus. Above it spreads upward and forward onto the parietal lobe. It comes into relation superiorly with the parietal type of cortex, and here is a triangular area, apex downward, with a base-line of about 60 mm. in length, and a perpendicular of about 30 mm., in which the two types are so confused as to render classification impossible. (Area indicated by both vertical and horizontal lines in Plate III.) The base-line of this triangle is formed by the horizontal branch of the interparietal sulcus and a projected line directly back from there. Below and in front of this unclassified zone the common temporal cortex reaches as far forward as the sulcus interparietalis proprius, which it follows downward for some distance and finally crosses, forming a narrow band along the anterior face of its lower end. Here again is an area of cortex bearing likeness to both temporal and parietal types and passing forward as a triangular patch to include the Rolandic opercle.

Mesial Aspect.—On the mesial aspect the common temporal type of cortex begins posteriorly at the line given for the anterior border of the visuopsychic cortex. Above, in the posterior part, it is separable from the limbic type along a line projected directly

anteriorly from the end of the common calcarine trunk. Over it anteriorly lies the specialized cortex of the pyriform lobule, whose outline will be given in more detail later.

Intermediate Postcentral Cortex.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Very few fine fibrils.

2. *Supraradiary Plexus.*—Poor fiber content. All fibers of small caliber.

3. *Line of Baillarger.*—Recognized with difficulty.

4. *Radiations of Meynert.*—Short and rather poor. Only an occasional medium-sized fibril.

5. *Interradiary Plexus.*—Fair number of fine fibrils.

6. *Association Fibers.*—Few but strong.

CELL LAMINATION.

1. *Plexiform Layer.*—Not remarkable.

2 and 3. *Layers of Small and Medium-Sized Pyramidal Cells.*—Layers not separable. Cells closely packed, but small and poorly differentiated.

4. *External Layer of Large Pyramidal Cells.*—The large cells in this lamina are definitely smaller than in the postcentral zone. Many undifferentiated cells and small pyramidals.

5. *Layer of Stellate Cells.*—Well represented.

6. *Internal Layer of Large Pyramidal Cells.*—Very few giant cells, even in central parts of the field, and as the posterior border is approached they are entirely wanting. The large cells of this lamina are also fewer than in the postcentral cortex.

7. *Layer of Fusiform Cells.*—Noticeably thinner zone than in postcentral field. Cells few.

DISTRIBUTION.

Mesial Surface.—Intermediate postcentral cortex is found occupying all of the paracentral lobule, behind the postcentral distribution and below it, fusing with the intermediate precentral type just below the end of the sulcus paracentralis. Along the superior margin of the hemisphere it crosses the upturned end of the middle portion of the sulcus cinguli for a short distance.

Lateral Surface.—Bounded anteriorly by the line given for the posterior margin of the postcentral cortex. This line, however, is by no means a definite one, and may have been misinterpreted in places. At the point where the postcentral cortex crosses the mesial border it extends back of the superior division of the postcentral sulcus (which is continuous with the sulcus cinguli) for about 10 mm., but soon moves forward so that this sulcus forms its posterior boundary. This patch is not shown on the plot of the lateral face on account of the angle from which this view is taken. From the bottom of the superior division of the sulcus postcentralis this type of cortex passes in a fairly direct line to the sulcus interparietalis proprius, which it follows for a short distance and then crosses, to be limited by a short sulcus arising and ending in the interparietal, cutting off a small island of cortex. Then it again turns forward, crossing the interparietal and passing just above the end of the inferior division of the postcentral sulcus, and narrowing rapidly to reach the Rolandic fissure at about the level of the lowest point reached by the motor cortex.

Parietal Cortex.

fiber arrangement.

1. *Zonal Layer.*—Very few delicate fibrils.

2. *Supraradiary Plexus.*—Very poor in fibers, especially in upper layers.

3. *Line of Baillarger.*—Made out with difficulty as a wide band, in places, thin enough in the center to suggest reduplication.

4. *Radiations of Meynert.*—Bundles small, but fairly long and compact. Occasional medium-sized fiber and the remainder fine. No course fibers observed.

5. *Interradiary Zone.*—Fairly rich in fine fibers, but not easily outlined from lower parts of the line of Baillarger.

6. *Association Fibers.*—Moderate number of medium-sized fibers. Large ones rare.

cell lamination.

1. *Plexiform Layer.*—Not remarkable.

2. *Layer of Small Pyramidal Cells.*—Many cells but rarely one which shows a pyramidal outline.

3. *Layer of Medium-Sized Pyramidal Cells.*—Fairly wide zone. Columnar arrangement to accommodate the radial prolongations.

4. *External Layer of Large Pyramidal Cells.*—Large pyramidal cells fairly numerous. Giant cells absent.

5. *Layer of Stellate Cells.*—Wider zone than in the intermediate postcentral cells. The large cells of this layer are fairly frequent and well formed, and of medium size.

7. *Layer of Fusiform and Triangular Cells.*—Many fusiform and triangular cells mixed with undifferentiated cells, forming a fairly deep lamina.

DISTRIBUTION.

Mesial Surface.—The lower boundary of this type of cortex is found by the parieto-occipital sulcus. The anterior edge comes in relation with the limbic cortex and is difficult to define, on account of the lack of sulcal landmarks. Roughly, however, the limbic type of cortex forms a wide band paralleling the posterior border of the interventricular opening, and near its mid-portion there is a quadrilateral promontory of limbic type jutting out into the precuneus. Above this the parietal projects between the limbic lobe and the paracentral lobule as a narrow triangle, and is sharply limited by the upturned end of the sulcus cinguli, except near the mesial border where the intermediate postcentral overlaps as has been described.

Lateral Surface.—The posterior boundary of the intermediate postcentral serves to outline the parietal field anteriorly. Below it grades off into the common temporal field in the manner already described. Behind it is separated by a wide band of common temporal cortex from the visuopsychic area, until it reaches the mesial border, where it is in apposition to the latter along the parieto-occipital fissure.

LIMBIC LOBE.

PYRIFORM LOBULE.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Dense mat of fine fibrils with an occasional medium-sized varicose fiber. A few fibers of Martinotti seen.

2. *Supraradiary Zone.*—Very sparsely supplied with fine fibrils and occasionally a larger fiber projected from the radiations.

3. *Line of Baillarger.*—Represented by a very narrow zone in which there is a slight increase in the number of horizontally placed fine fibers, still further increasing and grading into the interradiary plexus below.

4. *Radiations of Meynert.*—Thin and widely separated. Consist of fine fibrils only.

5. *Interradiary Plexus.*—Of about the same fiber caliber as the radiations. Poor meshwork.

6. *Association Fibers.*—Very few.

CELL LAMINATION.

1. *Plexiform Layer.*—This part of the cortex is overlaid by a greatly thickened pia mater containing numerous hyaline globules in clusters. The cell nests in the lower layers of this lamina are rather small, containing as a rule about a dozen cells of the large type. In places the nests occur close together, and the individual groups are more or less elongated, suggesting the formation of a definite lamina instead of isolated clusters.

2, 3 and 4. *Layers of Small, Medium-Sized and (Internal) Large Pyramidal Cells.*—These three layers can not be separated. They form a deep layer of cells of about the same size, which occur more widely apart than in any other region of the cerebrum. The entire cell content seems to have reached a higher developmental differentiation here also, and the oval nuclei with small amounts of protoplasm are very infrequent. Most of the larger cells of this layer, as well as in the internal large pyramidal and fusiform laminæ, are surrounded by groups of satellite cells, in some places eight or ten occurring as a complete ring around a large nerve-cell. Sections from this cortex were stained in phosphotungstic acid hematein after mordanting in ammonium bichromate and picric acid, and revealed a fairly thickly matted meshwork of neuroglia fibrils running in all directions, and distributed fairly generally throughout the whole cortex. These fibrils are for the most part delicate and curly, but scattered throughout are also coarser fibers. They are arranged in no definite direction.

5. *Layer of Stellate Cells.*—Thin, pale lamina showing a few glia cells with one, two or more nuclei, but very few nerve cells.

6. *Internal Layer of Large Pyramidal Cells.*—Thick lamina

with well differentiated large cells lying far apart. Many satellite cells.

7. *Layer of Fusiform Cells.*—Cells of large size and widely separated. Layer deep.

DISTRIBUTION (OLFACTORY AREA OR PYRIFORM LOBULE).

In the gross description of the temporal lobe was mentioned a shallow, vascular impression in the approximate position of the fissura rhinica of Zuckerkandl. Sections through this area show that the vessel groove really overlies a sulcus, but that the opposing walls are so closely approximated and the sulcal depth so slight, that the groove only is recognizable in the gross. Plate IV shows this groove, which is the anterior limit of the lobus pyriformis in those normal brains in which it is found, and which marks sharply the transition here from the olfactory to the common temporal type of cortex. The olfactory type passes backward from here in a narrowing band, ending about opposite the origin of the peduncle by a gradual merging into the adjacent cortex characters.

HIPPOCAMPAL AREA.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Rich supply of fine fibrils. The remainder of this cortex shows a very sparse supply of fine fibrils running in all directions. There is no evidence of a line of Baillarger, and there are no definite radiations, although here and there are found two or three very fine fibrils in a group with a radial direction.

CELL LAMINATION.

1. *Plexiform Layer.*—Thick. A moderate number of clusters containing from 15 to 20 small stellate cells.

Beyond the first layer no laminate arrangement can be made out. The cortex presents a close-packed mass of oval nuclei, with here and there a fully differentiated medium-sized pyramidal cell.

DISTRIBUTION.

In the gross description it will be seen that no hippocampal fissure was recognized, and the microscopic examination fails to reveal any hint of such a structure. The cortex of this region

shows the poorest supply of fibers and the greatest paucity of developed cells of any part of the cerebrum, but the occurrence of the characteristic cell nests of small stellate cells in the plexiform layer would seem to justify its inclusion in the description. As to its distribution, it may be said that it is a very narrow and poorly demarcated band following the position which the hippocampal fissure might be expected to assume.

GYRUS FORNICATUS.

In studying the structure of the gyrus fornicatus so little difference was found between the anterior and posterior parts, that they will be described here in one group, and the points of difference indicated in the lamina where they occur.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Fairly richly supplied with very delicate fibrils. Fibers of Martinotti occasional.

2. *Supraradiary Zone.*—Very delicate fibrils in fair numbers.

3. *Line of Baillarger.*—Not recognizable.

4. *Radiations of Meynert.*—Entirely of small fibrils, but fairly thick groups.

5. *Interradiary Plexus.*—Fibers poor in number and of small size.

6. *Association Fibers.*—Very rare. Medium size.

CELL LAMINATION.

1. *Plexiform Layer.*—Fairly broad.

2. *Layer of Small Pyramidal Cells.*—Definite though narrow lamina. Cells closely packed, but many of them are undifferentiated.

3. *Layer of Medium-Sized Pyramidal Cells.*—Deep lamina, but not easily distinguished from the next below.

4. *External Layer of Large Pyramidal Cells.*—This layer is of good depth and contains many typical cells with their axes inclined irregularly. There is a tendency toward pyknosis, but this is not especially marked.

5. *Layer of Stellate Cells.*—Not represented.

6. *Internal Layer of Large Pyramidal Cells.*—This group is not shown as a definite lamina, but near the lower levels of the

external layer of large pyramidals the differentiated cells are noticeably of more frequent occurrence, and at the edges of the field, where the stellate layer again makes its appearance, thereby serving as a good guide to the distribution, it seems to cut off the cells of this lower level from the overlying ones, the former continuing as the internal large pyramidal layer of the adjacent cortex. In other words, the deep lamina of large pyramidal cells seems here to represent both the internal and external layers of other parts with the dividing line of small stellate cells omitted. This view is in opposition to Campbell, who holds that the internal large pyramidal layer is lacking in this cortex as well as the stellate.

7. *Layer of Fusiform Cells.*—It is in this layer that the difference between the anterior and posterior parts of the gyrus is evident. Anteriorly the layer is a thick one with many well differentiated fusiform and triangular cells, and with some pyknotic or chromophilous spindle cells. From Campbell's illustration and description, it seems probable that these elements are greatly reduced in number. Very few low-power fields were found which showed more than one cell of this kind.

Posteriorly the layer is considerably thinner and lacks the chromophilous cells.

DISTRIBUTION.

The limbic type of cortex occupies all of the gyrus fornicatus. In addition it spreads anteriorly over the next adjacent gyrus. Above it follows out along the diverging part of the anterior division of the sulcus cinguli as far as the communicating branch between this division and the second. The second division forms its boundary back to the paracentral lobule, where a wedge of parietal cortex is interposed and from there backward and downward it passes as a band of fairly even width, except for the quadrilateral patch mentioned in the description of the parietal boundary.

INTERMEDIATE PRECENTRAL.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Fairly numerous small fibrils and occasionally a coarse varicose fiber.

2. *Supraradiary Zone.*—Small fibers rather sparsely scattered.

3. *Line of Baillarger.*—Poor but definable. Chiefly long evenly medullated fibers.

4. *Radiations of Meynert.*—Strong bundles of fine varicose fibers containing one or two evenly medullated fibers of medium size.

5. *Interradiary Plexus.*—Well marked. Fibers of small caliber.

6. *Association Fibers.*—Numerous coarse fibers running in all directions.

CELL LAMINATION.

1. *Plexiform Layer.*—Not remarkable.

2 and 3. *Layers of Small and Medium-Sized Pyramidal Cells.*—Wide zone, but not recognizable as two laminæ. Majority of cells well differentiated.

4. *External Layer of Large Pyramidal Cells.*—Wide lamina containing many large well differentiated cells. Considerable pyknosis.

5. *Layer of Stellate Cells.*—Poorly defined.

6. *Internal Layer of Large Pyramidal Cells.*—This layer is a thin one, but its cells are large and well formed. Their size is greater than that of the cells in the external layer, but definitely smaller than the homologous cells in the precentral cortex, and there are no giant cells present.

7. *Layer of Fusiform Cells.*—Very poorly represented. Cells few and small.

DISTRIBUTION.

Mesial Surface.—The sulcus paracentralis forms a posterior boundary of this type of cortex, and its extent is also limited by the end of the dorsal portion of this sulcus where it comes in relation below the motor and postcentral types with intermediate postcentral cortex. Below, it follows the middle division of the sulcus cinguli forward to the communicating sulcus, between this division and the anterior, where it turns upward and is sharply limited from the limbic cortex. The portion of the first frontal gyrus immediately overlying this point shows characters which are common both to this type and to the frontal, and no definite outline is possible.

Lateral Surface.—On this aspect the anterior boundary of the motor cortex limits the intermediate precentral posteriorly. Its anterior line above is hard to make out, and a considerable area remains unclassified. This is shown on the plot as the triangular patch on the first frontal gyrus containing both small and large dots. Below this zone on the second frontal this type forms a skirt about 25 to 30 mm. wide in front of the precentral cortex. Still lower the band narrows, and is limited anteriorly by the inferior division of the precentral sulcus. Below the motor field on the posterior border, the intermediate cortex touches the fissure of Rolando, and comes into relation with mixed parietal and common temporal cortex covering the Rolandic opercle. The intermediate crosses the precentral sulcus on a level with the lowest point reached by the motor cortex and passes forward to include the three opercular gyri surrounding the anterior limb of the fissure of Sylvius. Below, this patch ends at the fronto-marginal sulcus of Wernicke.

Frontal Cortex.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Few small fibrils.

2. *Supraradiary Zone.*—Scattered small fibers chiefly horizontal in direction.

3. *Line of Baillarger.*—Barely definable. Fibers small.

4. *Radiations of Meynert.*—Fairly strong clusters of fine fibrils with only an occasional medium-sized fiber.

5. *Interradiary Plexus.*—Poor network of fine fibrils.

6. *Association Fibers.*—Few long evenly medullated fibers of medium size.

CELL LAMINATION.

1. *Plexiform Layer.*—Not remarkable.

2 and 3. *Layers of Small and Medium-Sized Pyramidal Cells.*—Fairly thick layer, but with very few developed cells.

4. *External Layer of Large Pyramidal Cells.*—The cells of this layer are numerous, and among them are a fair proportion of large pyramids of good form.

5. *Layer of Stellate Cells.*—Noticeably wider than in the intermediate precentral field.

6. *Internal Layer of Large Pyramidal Cells.*—The cells of this layer show the best differentiation of any lamina of this field. They are of fair size with strong basal processes, and occasionally a few chromophilic particles.

7. *Layer of Fusiform Cells.*—Zone narrow. Poor in cells.

DISTRIBUTION.

Mesial Surface.—Beginning behind in the unclassified zone mentioned in the distribution of the intermediate precentral zone it passes forward, separated from the limbic type by the anterior division of the sulcus cinguli, for about 70 mm., where it fuses imperceptibly with the prefrontal.

Lateral Surface.—On this aspect the frontal type forms a band about 30 cm. wide, skirting the intermediate precentral. Where the latter field passes forward over the anterior Sylvian opercular gyri below, the frontal area is very considerably narrowed and remains so as it passes over to the orbital surface, including there only the narrow gyrus lying to the mesial side of the fronto-marginal sulcus and that part of the adjacent gyrus not occupied by intermediate precentral cortex.

Prefrontal Cortex.

FIBER ARRANGEMENT.

1. *Zonal Layer.*—Very poor supply of poor fibers.

2. *Supraradiary Zone.*—Rare fine fibril.

3. *Line of Baillarger.*—Not recognizable.

4. *Radiations of Meynert.*—Clusters of three or four short, fine fibers.

5. *Interradiary Plexus.*—Few scattered, very fine fibers.

6. *Association Fibers.*—None.

CELL LAMINATION.

1. *Plexiform Layer.*—Narrow.

2, 3 and 4. *Layers of Small, Medium-Sized and (External) Large Pyramidal Cells.*—These layers form a fairly deep zone which is not separable into different laminæ. The cells are numerous and close-packed, but for the most part with oval nuclei only, with little or no protoplasm. Frequently the nuclei are more

or less vesicular in type. In the lower layers an occasional large pyramidal cell can be made out, and where they are seen they are well formed and of fair size.

5. *Layer of Stellate Cells.*—Wider than frontal.

6. *Internal Layer of Large Pyramidal Cells.*—This layer compares very closely with the description of the second, third and fourth layers given above except that it is considerably narrower and that fully differentiated large pyramidal cells are slightly more numerous.

7. *Layer of Fusiform Cells.*—Narrow belt containing few small cells.

DISTRIBUTION.

The distribution of the prefrontal is perhaps best outlined by the statement that it occupies all of the frontal pole anterior to the limits described for the limbic and frontal cortex on the mesial surface, and by the frontal on the lateral aspect. On the orbital surface it covers all of the gyri except the narrow band of frontal type along the fronto-marginal sulcus posteriorly.

The homology between the fissures and sulci of the brain under consideration and the normal, will be easily seen from the foregoing description, but a few points of sulcal arrangement deserve especial note.

The anastomosis between the Sylvian fissure and the first temporal sulcus is mentioned by Van Hersecke. He quotes from Giacomini four cases out of 400 brains, while Chiarugi is credited with the statement that it was found in four cases out of 32 brachycephalics and one out of ten dolichocephalics.

The upward prolongation of the first temporal sulcus is of more common occurrence. Eberstaller says that not infrequently the ascending part of this sulcus joins the pars horizontalis of the interparietal, thus cutting in two the gyrus angularis. Ecker says that the first temporal extends backward and upward to very different distances in different cases. Its posterior extremity lies as a rule higher than the Sylvian, and in every case the gyrus angularis winds around it to be continued into the second temporal. Wilder shows an illustration of a brain with a greatly extended supertemporal sulcus, and in Van Hersecke's article is

a reproduction of an illustration of the brain of the Venus Hottentoti of Gratiolet, which bears a similar peculiarity.

The interparietal follows the common type as described by Cunningham, *i. e.*, all three parts confluent. This arrangement Cunningham quotes as present in 56 per cent of 62 brains examined.

Many authors consider the normal origin of the interoccipital of Dejerine to be in the interparietal. Cunningham calls it the ramus occipitalis of this fissure. Wilder, however, gives it as arising from a stipe and ramus independent of the interparietal, and this is the arrangement followed here.

The sulcus mentioned in the gross description as arising in the temporo-occipital angle and continuing back to fuse with the inferior branch of the first temporal, is probably the occipito-temporal of Lussana. Wilder shows a brain with a somewhat similar sulcus and says that it may possibly be considered as the homologue of the exoccipital or fissure of Wernicke. An even stronger statement seems justifiable in the present case when the distribution of the visuopsychic type of cortex is considered along with the position of the fissure. Fig. 1 gives a rather misleading idea of the relation of this fissure to the first temporal, due to the distortion of the projection. Plate III is more apt, and beyond the point of junction of these two sulci, the direction is almost as much like a continuation of the occipito-temporal as of the first temporal. Although the true sulcal character of this cleft is lost before it reaches the mesial border, it is continued as a vascular groove up to the angle where its contained vessel enters the notch formed by the end of the occipito-parietal sulcus on the mesial surface. The delimitation on the lateral surface of the visuopsychic type of cortex along this fissure adds interest to its possible homology to the exoccipital sulcus of the ape's brain, which there serves as the anterior boundary of the same type of cortex. This homology and its possible significance have given rise to considerable controversy. Mendel, in his article entitled "Ueber die Affenspalte," concludes that a homologous fissure occurs in man, both sound-minded and otherwise, but no pathological significance has been demonstrated.

The vascular groove occupying the position of the fissura

clinica of Zuckerkandl is, as has been pointed out, undoubtedly that of a vessel which lay in that sulcus before the internal pressure of the enlarging ventricle had manifested itself to such an extent as to obliterate the gross evidence of the existence of the sulcus. Microscopically the sulcal construction is readily observable.

No trace, either gross or microscopical, could be found of the hippocampal fissure.

The downward displacement of the calcarine fissure is mentioned under the discussion of the distribution of the visuosensory type of cortex, and is explainable by the greater distension of those portions of the occipital lobe above it.

The existence of the vertical sulcus at the end of the calcarine is worthy of mention. This is the sulcus retrocalcarinus verticalis of Elliot Smith, called the fissura extrema by Seitz, and the retrocalcarine by Monakow.

In the normal cerebrum the transition from one type of cortical lamination and fiber arrangement to the next, is so gradual that with a few exceptions it is difficult to outline even approximately the limits of the fields. Bevan Lewis says "no abrupt passage from one form of cortical lamination to that of another is ever seen in the convolutions of the vault. Changes in type are gradually assumed, and no distinct boundary line exists to indicate an exact line of demarcation. The structure peculiar to one region gradually fades and blends with the arrangements which foreshadow the architecture of adjacent realms, and thus we obtain transition regions."

In the present case the pathological alteration of the cortical structures is such that in some places it serves as an aid, while in others a hindrance to limitation. In certain areas the internal pressure by flattening and narrowing the cortex has served to compress and render more compact some structures, thus accentuating their prominence. The comparative density of the line of Gennari is a striking example of this. Fig. 6 is a low-power microphotograph showing a portion of the calcarine field with the prominent line of Gennari and radiations of Meynert.

In many areas, however, the number of nerve-cells represented only by embryonal or imperfectly developed forms makes their

classification more difficult. Here again, however, enters a factor which is absent in normal cortex: the proportion of fully developed cells seems to vary with the importance of the field. Thus the large common temporal and parietal areas are very poorly supplied with differentiated cells, though the total cell content is remarkably rich. Their fiber content, as elsewhere, varies directly with the number of differentiated cells. This contrast of cell development between areas serves in some places as a marked aid; thus, in limiting the visuopsychic from the common temporal fields along the occipito-temporal sulcus, it is a factor of importance. In other places, however, the same condition interferes; for instance, between the common temporal and the parietal fields and along the outskirts of the intermediate pre- and postcentral zones. In regard to the distribution of the cortical fields, nothing need be added to the description already given under each separate area.

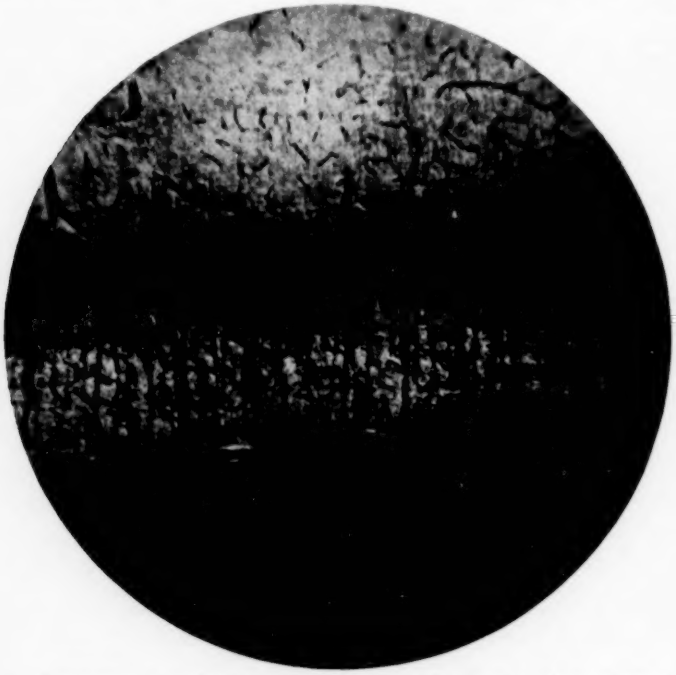

FIG. 6.—Low-power microphotograph of a field in the visuosensory area.

Reference has been had to Flechsig's charts of the time of myelinization of the cerebrum, and an attempt has been made to correlate the cortical development of the various localities with his findings, and in general the comparison is apt, though there are some points of difference.

It will be readily seen from the illustrations that with the exception of those parts of the occipital and temporal lobes where the attenuation is most marked, the complement of fissures and sulci is equal to that of the normal at least, and even in the two excepted areas, the microscope gives evidence of the original existence of sulci which have disappeared during the alterations wrought by the pressure. The full development of the sulci is not reached in the normal brain, according to Cunningham, until one month after birth, so that it seems reasonable to deduce that the internal pressure had not progressed very far before that time. On the other hand the enlargement of the head indicates that the pressure was active before the ossification of the cranial sutures, thus placing the time of appearance of the pressure effects between those two periods.

As to the time of the appearance of the lesion in the aqueduct, there is no further evidence. Its type is such that no definite diagnosis can be given. The microscopic picture is one which is consistent with the diagnosis of a chronic inflammatory process, but there is no evidence to exclude the superimposition of a chronic inflammation, arising from pressure, on a previously existing developmental fault. The presence, through the obstruction, of patent neuroglia-lined canals may explain why the patient lived to maturity, and in this event a gradual narrowing of these channels by added inflammatory deposit or by contraction of the glial cicatrix already present, would readily explain the slow retrograde course of the disease, *i. e.*, the increasing imbecility, etc. Bourneville et Noir report a case of a child who, until the age of seven months was apparently normal, then developed convulsions and *pari passu* an enlargement of the head. The child lived nine years with occasional epileptic seizures. At autopsy the aqueduct of Sylvius was found to be occluded. The fissures and gyri have their normal distribution and the lower structures are normal. This would seem like a clear case of postnatal development, while

on the other hand E. Cantley describes a child that lived four months after birth with its prosencephalon represented by a membranous bag of fluid. The crura, pons and lower structures were

FIG. 7.—High-power microphotograph. Limbic lobe. Showing cell richness of areas where attenuation of cortex is marked.

present. Such a condition is explainable only on the ground that the obstruction was present before the cerebral structures were advanced in their development.

In several reported cases of hydrocephalus, mention is made of various degenerations in the spinal cord and medulla, usually in

the pyramidal tracts, occasionally in other paths, giving the picture of a secondary degeneration. In the present instance no such alterations were observable.

Huseck and Kramer describe a case in a patient of 40 years who was practically a helpless idiot. The legs were contractured and at autopsy there was found a bilateral degeneration of the pyramidal tracts from the peduncle to the sacral region. The sulci are fairly well homologized. The microscopic report gives the cells as close-packed but normal, fibers lessened in number. The ependyma is thickened and contains many corpora amylacea.

G. Anton also adds, in a list of three congenital cases, one associated with atrophy of one olive, one side of the cerebellum, and one cerebellar tract in the cord.

Touche gives the report of an autopsy on a 29-year old hydrocephalic who had been apparently normal to his fourth year, when the disease manifested itself with an acute onset and convulsions. The fissures and gyri are easily made out and not anomalous. The aqueduct of Sylvius is obliterated. There is no microscopic report and, although the patient was paralyzed in the lower extremities, no record of the findings in the cord.

Spiller reported a case in 1902 of a patient who lived to the age of 19. The aqueduct was to the naked eye entirely closed, but microscopically, as in the present case, a small canal was demonstrable through the obstruction. In an article by the same author in association with Allen in 1907, is found a description of a similar condition in a patient of 62 years who was supposed to have been born hydrocephalic. To quote from this report: "The aqueduct was almost occluded, this occlusion being probably a congenital malformation because the cavity was well lined throughout by a layer of ependymal cells, which would hardly be the case if the occlusion were caused by proliferation of neuroglia." The occurrence of canals lined by ependyma in gliomata, and the cutting off of ependymal pockets in marked cases of granular ependymitis, are recognized, so that this evidence quoted in support of a malformation carries less weight than the time of onset and the degree of development of the affected structures.

There are reports galore in the literature of cases of hydrocephalus, but the great majority are merely statements of the

case histories with or without the gross autopsy findings, and with no microscopic examination.

The question of etiology in early hydrocephalus is one which can best be approached through statistical methods. The true hereditary origin has been suggested, but receives slight substantiation. Hereditary syphilis and congenital malformations are generally conceded as the leading causes. Spiller, in discussing one of his cases, suggests the toxin of the tubercle bacillus as a possible cause. Injuries during labor, acute toxemias in the mother, and uremia gravidarum are also mentioned as causative, while chronic leptomeningitis, either tubercular or otherwise, is frequently the cause of those cases where the obstruction is at the foramina of Magendie and of Key, and Retzius, in which case the fourth ventricle is included in the dilatation. Endocranial tumors may also produce on obstruction.

Conclusions.—The case is one of advanced hydrocephalus, but the surface anatomy and the cortical histology can be readily homologized with the normal. The variations of sulcal arrangement are such as are met occasionally in the normal brain. Alterations of the distribution of cortical fields with few exceptions are inconsiderable. The lesion was a partial obliteration of the aqueduct of Sylvius and might have been inflammatory in character or a malformation plus inflammation. The time of manifestation of pressure results is evidently between the end of the first month of postnatal life and the time of ossification of the cranial sutures, but the time of occurrence of the lesion can not be set so definitely.

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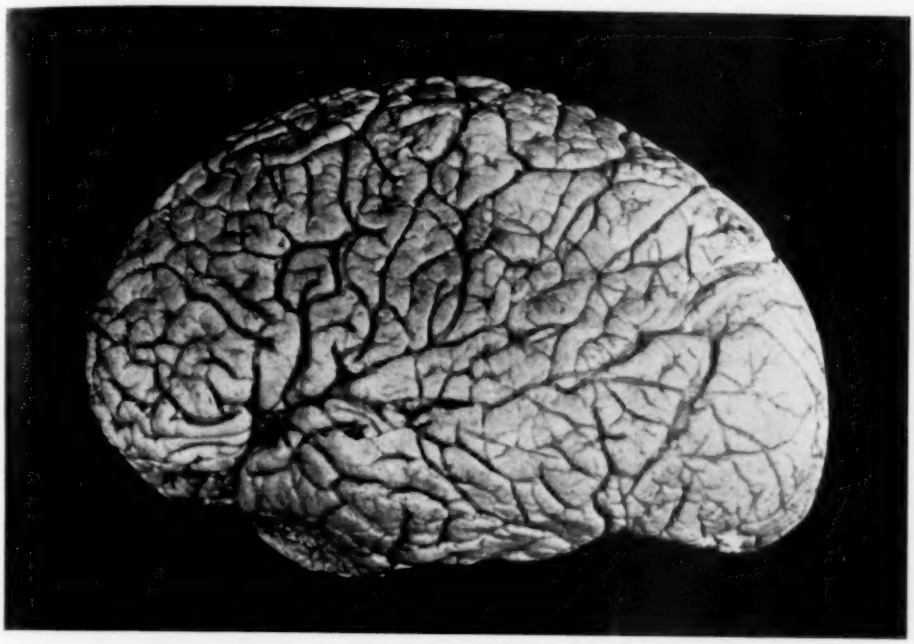

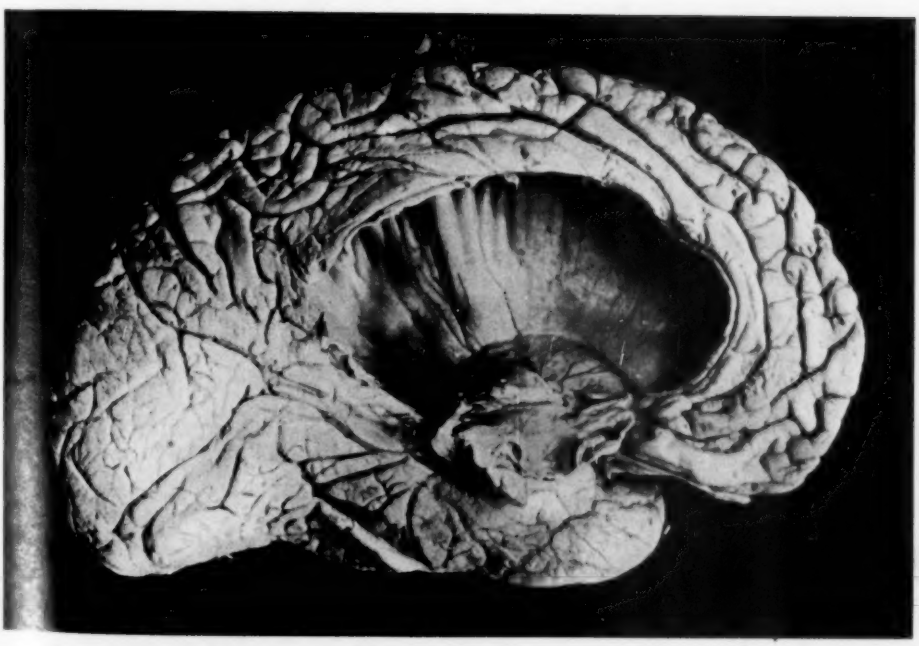

PHOTOGRAPHS OF THE LATERAL AND MESIAL ASPECTS OF THE LEFT HEMISPHERE.

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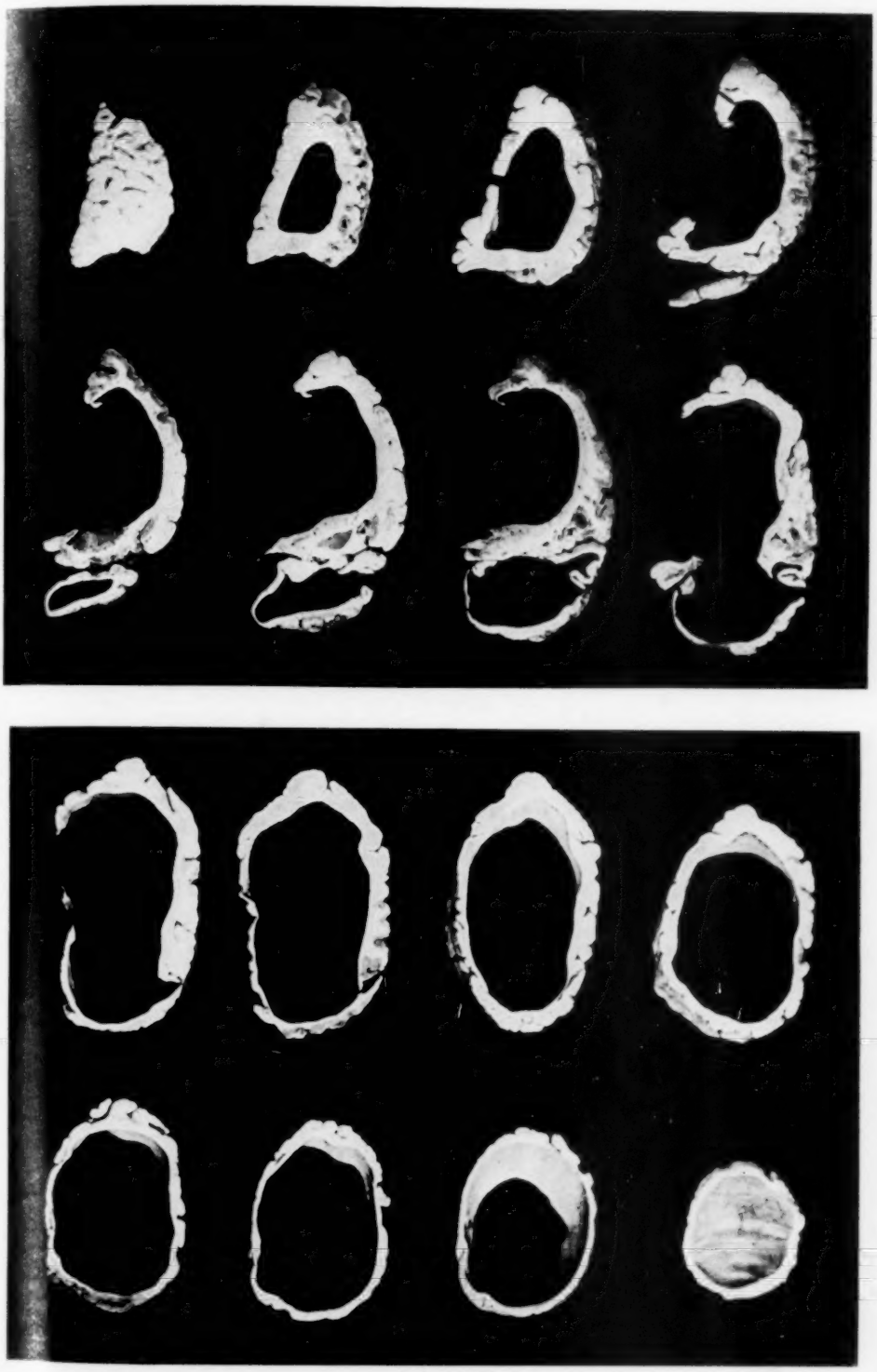

Gross Horizontal Sections of the Left Hemisphere.

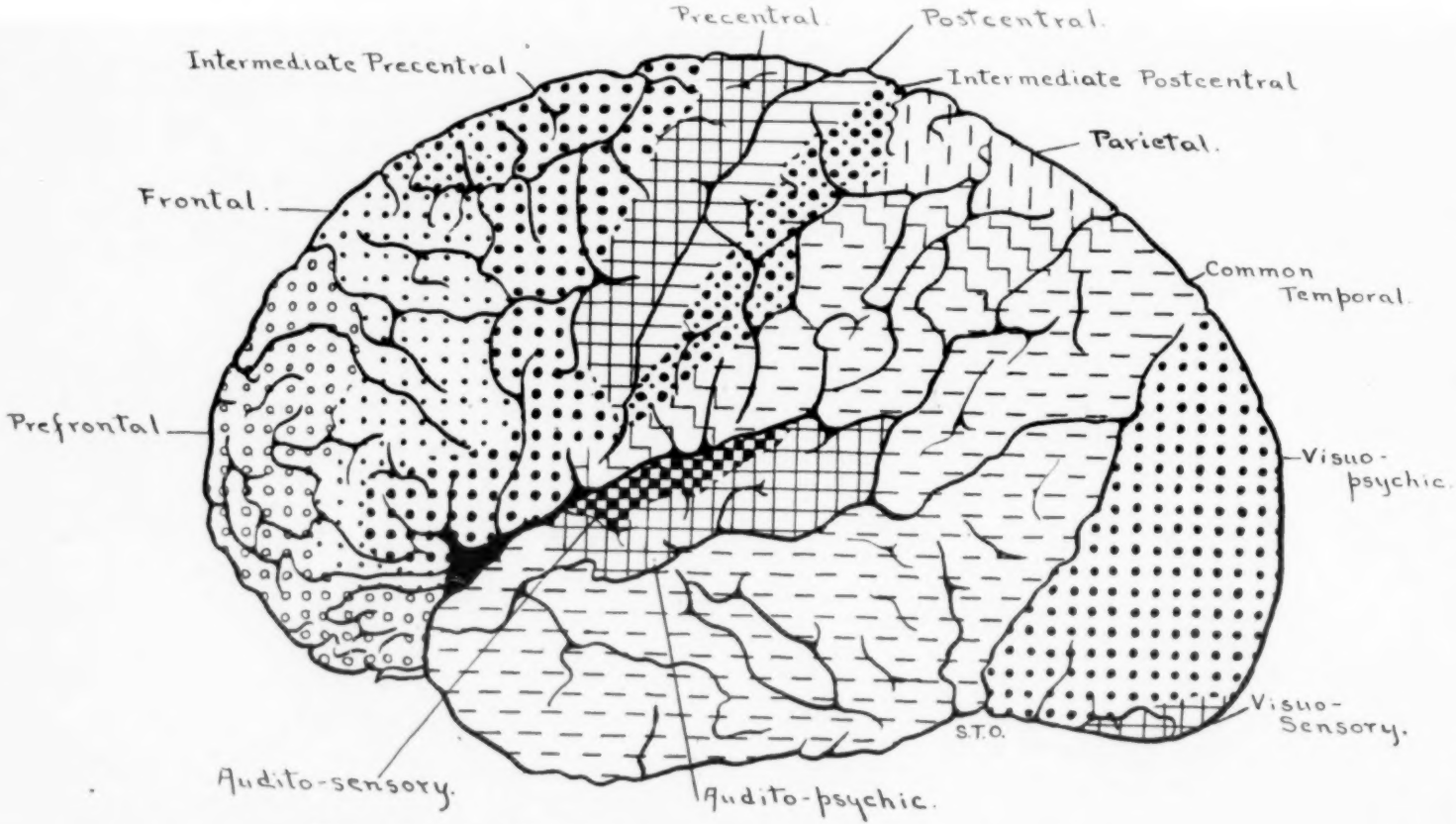

CHART SHOWING DISTRIBUTION OF VARIOUS TYPES OF CORTEX. LATERAL ASPECT.

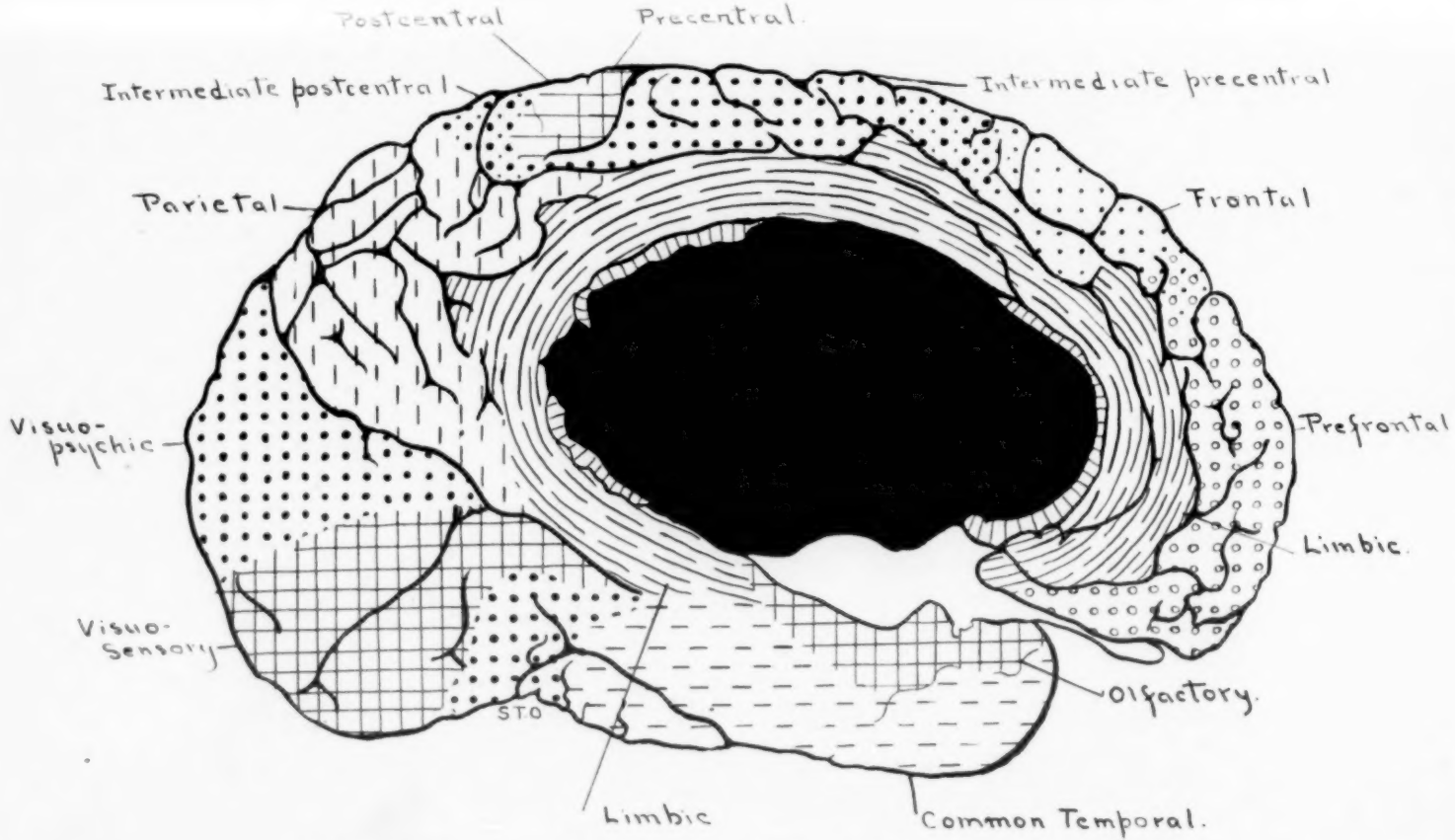

CHART SHOWING DISTRIBUTION OF VARIOUS TYPES OF CORTEX. MESIAL ASPECT.

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A CASE OF POLYNEURITIS, OF AUTOTOXIC ORIGIN, WITH KORSAKOW'S SYNDROME; WITH REPORT OF AUTOPSY AND MICROSCOPICAL FINDINGS.

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AND

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The patient, a woman aged 59, was admitted to this hospital June 14, 1907, on account of her mental symptoms.

Family History.—The following data were supplied mostly by the patient's niece. Father died of tuberculosis at the age of 72. Mother died at age of 70, of paralysis. Five sisters and three brothers died of pulmonary tuberculosis, one sister died at the age of 63, the others died before they were 20 years of age. According to the niece there was no insanity or nervous disease in the family. The patient at a time when she was mentally clear (July 5) reported, however, that her mother lost her memory before her death. One of the patient's nieces is excessively nervous; her sister was nervous, but not excessively so; the patient's daughter was very nervous and attempted suicide three months before the birth of her child and died a few months subsequent to childbirth at the age of 20; the patient's son died at the age of 20 of tuberculosis; and her grandson (son of the daughter who attempted suicide as noted above) shot himself in his grandmother's presence at the age of 20. He had tuberculosis, was weak-minded and addicted to the use of alcohol.

Personal History.—The patient was born in Pennsylvania, had a common school education; was married at the age of 18; had two children, one of whom died of tuberculosis, the other attempted suicide by inhaling illuminating gas and subsequently died after the birth of her child as noted above. The patient's husband died a few years after her marriage and she obtained employment in one of the departments of the government. She remained in this position for about 40 years. During this time her health was excellent with the exception of the three or four years before entrance to the hospital. About 1903 the patient became very nervous and had a feeling that she could not do what she wanted to do. If she wished to

write, for example, the muscles appeared to contract and they would not work. In 1904 she lost some power of the left side of the body, and she walked with a limp. She was very nervous at this time also, and she went to California for her health. She remained there for about eight months and then returned to her position in the department in Washington. She was, however, not able to do her work well and after working from November to July, she resigned her position. During the time she took up her work she was assisted by many of the clerks in the department in doing the work required of her, and it is evident she was not in a normal condition at any time. The grandson, mentioned above, suicided in her presence in September, 1906, and thereafter she became much worse. During the past five or six years she had employed a number of physicians and others to treat her at different times and about six weeks before her entrance here she was sent to the Home for Incurables. Her mental symptoms developed after she had been in that institution about four weeks. The medical certificate on entrance stated that the patient had a powerful will, but was good natured; she had severe rushes of blood to the head when shocked or excited; she had been much depressed, frightened, thought people were trying to poison her, and she had hallucinations of Indians in her room all the time.

A friend supplied the following notes, which at later clear periods the patient confirmed in the main. Some of the more important symptoms preceeding the present state were: Sensitive areas along the spine; great pain at the extreme lower end of the spine; congestion at the base of the brain; in this latter condition much relief was felt when the weight of the head was taken from the spinal column; general muscular contractions, especially marked in the neck and shoulder region; the left side of the body was not involved until recently; there was fear of falling when on the street; speech was hesitating; there were swollen fingers and inability to use the right hand. The first inception of her illness, a long time prior to her entrance to the hospital, was a violent attack of stomach trouble. This friend said she did not take alcoholic liquids, and was not a drug fiend of any character. Following are some of the diagnoses made and the treatment received at different times since 1902: (a) gastritis; (b) vasomotor trouble, nerve exhaustion and uric acid; (c) electrical treatment; (d) paralysis agitans, violet ray treatment; (e) mechanical massage; (f) congestion of the brain; (g) "cheiropractic" manipulation of the spine by hand, pulling and kneading the vertebræ, no medicines; (h) osteopathy; (i) sclerosis of the spinal cord; (k) neurasthenia, crushed ice to spine followed by hot applications, internal medication; (l) suggestion with gymnastics, a pseudo-mind cure; (m) bromides, arsenic, phosphorus, perhaps acetate of lead, chloride of gold, and vegetable poisons.

Physical Examination June 15, 1907.—Patient in bed. Stout, medium height, well-nourished white woman, weight about 190 pounds. Hair black, no bodily malformations; skull symmetrical; ears well-formed and symmetrical. Eyes blue, left lid droops. Complexion clear. Facial expression

one of exhaustion. Mucous membranes of tongue and mouth dry; tongue coated, dry and brown. Skin clear, free from eruptions; no apparent anemia. Skin over whole left leg is tense and shiny and soft tissues are swollen. Left arm is also swollen, as is also right hand. All these parts are painful when moved. Pressure from bed clothing was painful and there was some discomfort on pressure of legs and arms (muscular tenderness). Patient cries and groans when it becomes necessary to move her in bed. There is well-marked wrist and foot drop. Knee jerks and triceps reflexes exaggerated, but equal on both sides. Marked ankle clonus on both sides, equal, persisting for 20 to 30 seconds. There is marked tremor of groups of muscles over whole body, most marked in those groups which move the shoulder, forearm, toe, hip, chest and abdomen. The patient cannot voluntarily move arms or legs. There are involuntary evacuations of the bladder and bowel. Slight ptosis of left eyelid. Pupils react to light, directly and consensually. Impossible to test for accommodation reflex on account of non-cooperation of patient. Lungs and heart normal. No heart murmurs, pulse regular, of good quality and force, rate 90. Refuses to take food. Examination of urine, obtained by catheterization, negative; no sugar, no albumin, no casts. Temperature fluctuating, irregularly from 98 F. to 100 F.

Mental Examination June 15.—On admission patient seemed very much exhausted and appears the same to-day. She complains of great pain, more especially in left arm and leg. She moans and cries on the least attempt to move any part of her body. She was noisy, apparently confused and talked to herself most of the time since entrance last night. She is disoriented as to persons and place, but knows the year, the season and the month. She says she was moved during the night and placed in a basement. She heard voices talking to her throughout the night, and she was afraid some one would come to injure her. She also saw Indians in her room. Memory for her early life, so far as it was inquired into, is good. She knows the year of her birth and her age. She related a connected story of the occurrences of her life up to a few weeks ago, and this story in the main appears to be correct. The patient's attention can be attracted easily and held for some time.

The condition appears to be a neuritis, with a confusion from which the patient can be easily aroused, and with hallucinations and confabulations.

The notes made two and three days later show that the patient soon became able to control to a large extent the rectal and bladder sphincters. The swelling of the left leg decreased but increased on the right. The skin over the right shoulder, right breast and chest to the median line became shiny, and there continued some swelling of both ankles. During these two nights the patient slept comfortably. Temperature was 100 F., pulse 90-100. The knee jerks remain exaggerated. Clonus in both ankles which disappeared on the following day. No plantar reflex on either side. Wrist clonus on both sides, right greater than left. Pupils are large, react

promptly to light. Muscular tremors continue, more marked in hands. Pain is felt over both sciatics, even from very slight pressures. Ulnar nerves compressed without eliciting pain. Touches not well localized, many mistakes on both sides of body. Some touches are not felt, most are localized somewhere within the same spinal segment, but rather inaccurately, and some others are localized on the opposite side of body (allocheiria). Pain sense, measured by an algometer, is more sensitive. Mentally the patient is clearer, she shows some insight into her condition, both mental and physical. She remains unoriented as to people and place. Hallucinations continue, there are falsifications of memory of where she had been during the past few days. Patient's memory for past events not well brought out.

The following two days the patient showed some insight; there were visual and auditory hallucinations, particularly during the night, and at times she was delirious and talked incoherently. The tenderness over the sciatics decreased and she could move to some extent her toes, fingers and forearms. The tremors of groups of muscles continued. The knee jerks remained exaggerated, but the reactions were less than on the previous days. Ankle clonus persisted, the right being more marked than the left on one day and the reverse being found on the second day. The wrist clonus continued to be marked. No plantars, and no Babinski sign.

Following is an abstract of the clinical notes made during the next ten days, June 21-30. Physically the patient appeared improved. Pain from pressure was not so marked a symptom, and the voluntary control of parts of the body was greater than before. She could lift her hands to her face, and her legs free from the bed. The tremors of groups of muscles continued. The constant pain was localized chiefly in the left hip, although painful sensations were aroused when pressure was exerted over the inner and outer aspects of the upper legs. The ability to localize stimuli of a touch character had not improved and the patient continued to show an incomplete allocheiria. She was stimulated eight times on each leg in different places; two of these stimuli she did not feel, one she located on the upper leg when the lower leg had been touched; and seven she located on the opposite leg in the corresponding spinal segment. The knee jerks were exaggerated, the right was greater than the left. The triceps reflexes were equally exaggerated. There was well-marked clonus both in wrist and ankle on both sides. The plantar reflexes were present, but only a slight reaction was obtained. There was no Babinski sign. Temperature, 98 to 100.6. Mentally the patient was brighter and at times showed some insight into her condition, both mental and physical. She could recognize and name objects correctly, although at times she did not answer questions well. This was apparently because she did not understand what was said to her. She was very emotional, cried a great deal when her condition was discussed with her and when she related her experiences during the previous nights. She was not oriented as to time, place or persons. She thought she had been in this

hospital six weeks and did not know how she was brought here. Her memory for recent events was not good, but she gave correctly some dates in her early life. Fabrications were prominent. At times, especially during the night, she appeared delirious. During a clear interval the patient was closely questioned about her habits, alcoholic, drug, etc., but she stoutly protested that she had not taken any of these things. She also denied this during periods when she was apparently confused and her statements in this respect always tallied.

During the next five days, July 1-5, the physical condition remained about the same. The reflexes continued to be exaggerated; there was clonus in wrists and ankles, no Babinski, and the tremors in muscles were still marked. The patient could voluntarily move the fingers and foot, and although pain persisted, it was not so prominent. Temperature varied from 98.4 to 100.2. Mentally much of the time the patient was drowsy and asleep. When awake she was depressed about her condition, saying that she wished to die and that she would never be any better. She began to learn the name of the place and at times knew the names of physicians, knew the date approximately, gave correctly her age, but not the year of her birth. Some questions were misunderstood. Falsifications of memory continued to be a prominent symptom. Hallucinations of sight and hearing, especially at night. On July 5, she said that one of her former physicians had diagnosed her condition as hysterical. She strongly denied alcoholism and the taking of patent medicines; also other things that we thought could have produced a neuritis.

July 13. The patient developed a stubborn diarrhœa, which could not be checked by usual means. Pain not felt in arms or legs and no tender areas. The knee jerks, which to this time had been exaggerated, were diminished and equal. The tendo Achillis reflex on the right was absent, on the left tapping the tendon produced a clonus of the foot. The triceps jerk remained active on both sides, tapping the left produced a clonus of the wrist. Clonus of the wrist was found on both sides. The plantars were present and equal. The pupils were medium large, reacted promptly to light, both direct and consensually. Temperature, 98.4 to 101. Mentally she appeared improved; the hallucinations continued, however, and there was some difficulty in thinking. Memory was only fair, and there was some insight into her condition.

July 18. Physically the patient continued to improve, with the exception of the diarrhœa. There were some tender areas found on the abdomen, but these were probably due to the diarrhœa. To-day is the first day since entrance to the hospital that the patient had any appetite for food. The knee jerks were much diminished, both tendo Achillis jerks exaggerated and followed by clonus of the foot; plantar reflexes present; ankle clonus in both sides; left triceps reflex present, right triceps absent. Temperature, 98.4 to 100. Mentally there was depression, apprehension, difficulty in thinking ($4 \times 7 = 28$ took 90 seconds), and the patient was not oriented as to persons although she appeared to appreciate the char-

acter of the institution in which she was. She showed marked "personnenverkennung," the mistaking of persons; one of the physicians she thought was a priest whom she had seen on the ward several weeks previously, although there is not a slight resemblance.

August 2. The diarrhœa continued and the patient lost considerable of her subcutaneous fat. No definite tender areas. The knee jerks were equal but diminished; the tendo Achillis reflexes were exaggerated and followed by foot clonus; the plantar reflexes were well marked and also followed by foot clonus; temperature 98 to 99. Mentally depressed, disoriented for persons, and difficulty in thinking.

August 12. At this time diarrhœa had improved to some extent. There was pain on moving the arms; hand and fingers were rigid. Knee jerks barely perceptible; tendo Achillis reflexes diminished, but equal on both sides and not followed by clonus as hitherto; plantar reflexes well marked; triceps jerks diminished; no clonus followed attempts to elicit it in wrists or ankles. Temperature, 98 to 99.8. Mentally as in previous note, but hallucinations more prominent.

August 22. Patient weaker, although there was some improvement in the diarrhœa. Knee jerks very slight, the legs did not move and the presence of the reflexes could be determined only by feeling the quadriceps, which moved slightly; no tendo Achillis reflex; plantar reflexes present, normal and equal on both sides; no ankle or wrist clonus. Temperature, 98 to 99. Mentally no change noticeable.

August 27. Patient had become greatly emaciated and an extensive bed sore had developed. Knee jerks very much diminished; plantars present; triceps present; no ankle clonus; slight clonus in both wrists, more marked on right. Temperature, 98 to 98.4. Mentally, recognized one of the physicians who had been away on vacation since July 18; somewhat depressed; good memory for early life; memory for recent events much impaired; disoriented as to place.

September 6. Patient continued to fail physically, but no mental change since last note, and died at 10.30 p. m. Autopsy, September 7, 10.30 a. m.

REPORT OF AUTOPSY BY I. W. BLACKBURN, M. D., PATHOLOGIST, GOVERNMENT HOSPITAL FOR THE INSANE.

Body of medium-sized, fairly well-nourished white woman. Feet are in marked extension. Pupils equal and medium in size. A large gangrenous bed sore over sacrum.

Skull symmetrical, thin, porous, dura slightly adherent to bone. Brain: Weight, 1400 gms. Very slight opacity of pia, more marked over left side. Left convolutions in general coarser and broader than right, this is particularly noticeable in the middle region of the convexity. No anomalies of vessels of the base; some atheroma of carotids at their terminal portions and few patches elsewhere; carotids partly obstructed. Horizontal incision of brain reveals nothing except some œdema of brain substance.

Pineal gland shows two small cysts. No lesion of capsule or basal ganglia. Possibly some enlargement of perivascular spaces.

Heart: Weight, 290 gms. Superficial vessels tortuous; mitral valve admits two fingers, shows yellow patches in its anterior leaflets and edges are possibly thickened; aorta shows very slight traces of commencing atheroma.

Liver: Weight, 1400 gms. Presents fatty nutmeg appearance due to infiltration; small tumor on right border of right lobe on superior surface, imbedded in the tissue, the nature of this tumor cannot be determined from inspection; another tumor which has undergone cystic degeneration found on this border; another small one apparently of the same nature found at neck of gall bladder at the inferior border; some adhesions at the superior surface with the diaphragm were found.

Other abdominal organs: The abdominal fat has atrophied and become yellow. The uterus was found resting on the sacrum, the sigmoid flexure anterior to it. The uterus and ovaries, especially the left, are bound down by adhesions, both ovaries are greatly indurated, almost cartilaginous; on posterior surface of uterus is a medium-sized intramural fibroid, small one at fundus, medium-sized submucous one on anterior wall, another small fibroid at junction of body and cervix; small polypoid soft growths project in the uterine cavity.

Spinal column: There is a slight deflection of the spinous processes of the upper lumbar region to the right. Somewhat tortuous condition of the veins at lower end of the spinal cord; incision of the cord shows no change in structure, and careful palpation reveals no indurations.

The brain, spinal cord, and portions of the brachial and sciatic plexuses were removed for microscopical examination.

Portions of the nerves and spinal cord were stained according to the methods of Weigert-Pal and Marchi.

Nerves.—Both the sciatic and brachial showed evidences of acute degeneration by the Marchi stain, but the sciatic more so than the brachial. In the brachial some nerve bundles showed no evidence of degeneration, in others only a few specks were visible, while in others approximately a sixth to a fourth of the fibers were blackened. In the sciatic about a third to a half of the fibers in some bundles were degenerated while in others there were found only a few scattered degenerated fibers. From inspection—no careful count was made—it appeared that in proportion to the total number of fibers there were twice or three times as many degenerated fibers in the sciatic as in the brachial. This is in accord with the clinical observations which indicated a greater involvement of the leg nerve supply.

Spinal Cord.—Sections of the cord stained by the method of Weigert-Pal showed a thinning at the periphery, which was a

trifle exaggerated in the direct pyramidal tracts in the dorsal and sacral portions of the cord. In the cervical cord there were many fibers in the region of the septomarginal root zones which did not take the stain well and this region appeared much thinned. Sections stained by the Marchi method showed in the cervical cord a marginal degeneration, deeper in the direct cerebellar tract on one side and taking in portions of the columns of Burdach and Goll and Gower's tract. In the dorsal portion of the cord all the degenerated fibers in the tracts were marginal and in the lumbar portion of the cord in addition to the marginal degeneration more than the usual number of degenerated fibers was found in the anterior longitudinal bundles. Throughout the gray matter there was a slight amount of "peppering" with the most noticeable changes in the gray anterior and posterior commisures.

In the cells, particularly in those of the anterior horn, there was found an accumulation of chromatic substance so that many of them stained very darkly with osmic acid. The cells were not examined by the Nissl method. All these findings are in accord with the recently reported findings of Mills and Allen[1] and of Sims,[2], although in certain particulars they are somewhat different in accordance with differences in the clinical course and symptoms.

The clinical diagnosis of polyneuritis was made from the presence of the following conditions: Distribution of the disease in arms, legs and body; pain on pressure over nerve trunks; pain on muscular movement; muscular tenderness and tremors; foot and wrist drop; and œdema. This diagnosis was confirmed by the microscopical findings, as has been noted above. In conjunction with the neuritis the occurrence of hallucinations, memory and attention disorders, confusion, and confabulation gives an accurate picture of Korsakow's symptom complex.

On the physical side a number of peculiar conditions were found: The involuntary evacuations of bowel and bladder; the occurrence of a bed sore, and the exaggerated tendon reflexes coupled with diminished plantar reflexes. Mentally there were symptoms noted in the previous history and during the patient's

[1] C. K. Mills and A. R. Allen: This JOURNAL, LXIV, 327-339. 1907.
[2] F. R. Sims: Jour. Nerv. and Ment. Dis., XXXII, 160-171. 1905.

stay at this hospital that hinted at an hysterical condition. One of these is the allocheiria.

The involuntary evacuations of the bowel and bladder existed in this hospital for only three days. How long it had existed prior to her entrance was not learned. At first the condition appeared to us to be due to the state of mental confusion and not to any actual loss of spinal-cord control. This conclusion is supported by the short duration and especially by the recovery of the control when the period of confusion became less marked. Toward the end of her life control was again lost, but this may have been assisted by the cord degeneration, which must have become marked at the latter period.

About two weeks before the death of the patient an extensive bed sore developed. The uncontrollable diarrhœa may have been the cause of this condition but it is impossible to exclude as a causative factor the neuritic condition. In many text-books bed sores are mentioned as unusual concomitants of polyneuritis,[3] but that the condition is not so uncommon is shown by the occurrence of a similar condition in two other cases of Korsakow's disease treated in this institution during the past seven years. In neither of these other cases was diarrhœa present and the bed sores were undoubtedly dependent upon the neuritis. We have not made a special examination of the literature on this point, but it may be mentioned that one of the patients, whose case histories have recently been reported by Mills and Allen, developed a bed sore some time before death. More references of this character could doubtless be found. It seems probable that bed sores are not oftener formed because of the short duration of the symptoms that make the patients helpless. It would, indeed, be strange if with all the other skin changes, especially the vaso-motor disturbances, there should not be a production of bed sores, which, so far as we know them, are due to similar changes in skin functions.

The condition of the reflexes, both deep and superficial, is noteworthy. In neuritis it is usual to find the tendon reflexes absent or at least diminished. Occasionally, however, especially at

[3] Starr: Familiar Forms of Nervous Disease, says: In neuritis bed sores have not been observed; p. 217.

the beginning of the disease, exaggerations have been observed. From the nature of the disease and from what we know physiologically of the conditions therein, an exaggeration during the first stages is to be expected, since the nerve fibers, their terminals and the cell bodies are hypersensitive. Only a most careful statistical study of patients from the onset of the disease will determine the truth of this conclusion, but we have seen at least one other case in which there have been exaggerated reflexes for some time after the onset. Our present data are not sufficient to determine the proportion of and the time during which the reflexes are exaggerated, but it seems likely that, instead of exaggerated reflexes being the exception during the first stages, it will be found that diminished reflexes are exceptional at this time. In the large majority of cases which are reported the patients have passed the early stages, in which the disease has often been dismissed from a neurological point of view by diagnosing it as rheumatism or other constitutional disease, and we have, therefore, in our statistics only the observations after the development of paralyses or excessive pain.

There can be no doubt that in this case the knee jerks were exaggerated on entrance and that they remained exaggerated for a month. After this period the knee jerks diminished during the next four weeks, until on August 12, eight weeks after the patient's entrance to the hospital, they were noted as barely perceptible. The tendo Achillis reflexes were also exaggerated on entrance and often the tapping of this tendon was followed by a foot clonus. The exaggeration of the tendo Achillis reflex continued longer than the exaggeration of the knee jerk; our first note of a diminution in this reflex was made August 12, at the time the knee jerks were barely perceptible. Another peculiarity of the reflexes is the absence of the plantars on both sides. For a week after entrance to the hospital a plantar reflex could not be obtained in either foot. This statement refers not only to the movement of the toes, flexion, but also to the wide-spread movement of the leg which may be spoken of as the defence reflex. A week after entrance the toes moved slightly, and the reflexes were noted "diminished." Later, two or three weeks after entrance, after the patient had partially recovered the power to

move voluntarily the toes, feet and legs, both the flexion of the toes and the defence reaction returned to a normal condition. Thereafter these reflexes remained normal and equal on both sides. At no time was there found a sign of a Babinski reaction. Ankle clonus, so marked at first as to persist for 20 to 30 seconds if the ball of the foot was supported, gradually decreased in intensity until its disappearance about three weeks before the death of the patient. Wrist clonus was present from the first to the last, although during the last seven days it was not so well marked. The triceps reflexes were exaggerated on both sides at first just as were the tendo Achillis reflexes and knee jerks, but the arm reflexes gradually decreased during eight weeks so that at the end of that time they were recorded as "diminished." At one time it was impossible to obtain the reflex on the right side, but subsequently it was found present, but diminished.

In view of the non-involvement of the cord at the beginning of the disease the loss of the plantar reflexes is strongly suggestive of an hysterical constitution, if not of hysteria. This loss is particularly noteworthy since Bastian makes the general statement that "so long as sensibility to pain remains the plantars remain." There can be no doubt that the pain sense existed in this patient; it was perhaps deranged, but it was only after the disappearance of the painful experiences from pressures, etc., that the plantar reflexes returned. In conjunction with the loss of the plantars it should be remembered that the patient presented a picture of incomplete allocheiria at two examinations. A former physician told one of us that when he first saw the patient he was inclined to a diagnosis of hysteria or a mixture of hysteria and neurasthenia. At that time the patient had a very peculiar attitude and gait. She was partly doubled up and when walking she would take a few quick steps, then her movements would be slowed. She did not complain of any pain at that time and when she was sharply commanded to stand upright and to walk correctly she would do so for a few minutes, and then resume her former attitude and gait. It is now certain that her whole disease was not hysteria, since the anatomical findings are so clear, but the earlier crises may have been hysterical in nature, and assuming this, we can account for the multiplicity and variability

of her symptoms during the four or five years preceding her entrance to the hospital. Such a condition would account in some measure at least for the widely different diagnoses made.

From the history furnished us it is impossible to determine the exact length or duration of the attack. This would have been of some interest in connection with the state of the reflexes. It is true that the patient had not been well since an attack of acute gastritis for which she was treated about six years before entrance to the hospital but the gastritis and the neuritis were probably different diseases. It appears likely that the neuritis began only a few weeks before her entrance here, but the exact date is now indeterminate.

As the cause of the neuritis we think alcohol may be excluded. The patient was carefully questioned several times regarding her habits in this respect and always gave the same answer, that she did not take alcoholic liquors. She admitted that occasionally she would take a glass of beer in the summer time, but said that she did not particularly care for it, nor did she like wine, whiskey, gin or spirits of any kind. She strongly denied drinking such things as cologne and other alcoholic mixtures that are not usually considered beverages. These answers were the same at times when she was comparatively clear in mind and also at other times when she was greatly confused, so confused that she had to be roused at each question or the question repeated. While in the hospital she never asked for alcoholic liquors and refused offers of them. She did not believe they would do her any good but said she would take them if they were prescribed for her and if there was any chance they would be beneficial. She also said that former physicians had warned her not to take alcohol in any form and that she had not done so. Her relatives and friends were sure she did not take alcohol in any form. Alcohol in the form of patent medicines may also be excluded. The patient was not addicted to the use of these, although she volunteered the information that she had tried from time to time single bottles of well-known and extensively advertised medicines. None of those she had taken were distinctively alcoholic, however, and the small amounts she had taken could only be considered contributory if their effect was at all appreciable.

The patient had been engaged in the Treasury Department in Washington for about 40 years; her duties compelled her to handle a considerable amount of money in paper form, and it was first thought she might have absorbed sufficient of the metals in the print to account for the neuritis. It was learned, however, that her occupation was one concerned with dilapidated and almost unrecognizable paper currency, and it is certain that whatever amount of ink could have been removed from the bills had already been removed by constant handling before the bills were placed in her hands.

Poisoning from foods, drinking water, etc., can not be excluded absolutely, but there is nothing in the history or in the conditions of life of the patient that definitely points to anything of this sort. The absence of any quantity of similar patients in Washington leaves a supposition of this sort without any foundation. We are left, therefore, to conclude that the cause of the neuritis was something within the body, of the nature of a toxin, but we do not care to speculate on the location and the origin of the toxemia. Similar conditions have been described under the name of idiopathic multiple neuritis. There have been published reports of cases in which the neuritis was caused by diabetes, typhoid and typhus fevers, and Ballet and Rose describe a case in which they assign as the cause "alimentary intoxication." We are well aware that the use of the term "autotoxic" is an indication of our ignorance rather than of our knowledge, but, in view of any assignable cause, this term may be used with the probability of comprehension on the part of the reader.

CLINICAL AND ANATOMICAL ANALYSIS OF 23 CASES OF INSANITY ARISING IN THE SIXTH AND SEVENTH DECADES WITH ESPECIAL RELATION TO THE INCIDENCE OF ARTERIOSCLEROSIS AND SENILE ATROPHY AND TO THE DISTRIBUTION OF CORTICAL PIGMENTS.*

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I. General Statement.

The diagnosis of mental disease is not anywhere more difficult than in persons attacked in the fifth, sixth and seventh decades in life. This difficulty is paramount in the fifth decade, particularly in women, and is assumed to be connected with altering processes of growth and internal secretory changes. The problems shift their ground in the sixth and seventh decades and are particularly complicated by the suspicion of premature old age changes.

We have chosen to analyze the clinical and anatomical material, accessible to us, from cases developing or assumed to develop insanity in the sixth and seventh decades. We have been looking, consequently, toward the relation of these phenomena to senile phenomena rather than to the more complex or obscure conditions of earlier decades.

We have omitted cases of dementia paralytica, cerebral tumor, and extensive focal brain lesions from consideration in this group. The 23 cases here presented occurred in a series of 472 autopsied cases (1902-1907) at the Danvers Insane Hospital and were chosen on the ground of probable onset of mental disease in the sixth or seventh decade, as shown by reference to case-histories. All the cases had been observed by one (or both) of the writers or (in a few instances) by assistant physicians who were personally consulted concerning the fitness of these cases for the chosen group. The 23 cases represent a sifting out from about 50 autopsied cases which were thought at first to correspond to our criteria but were found actually to represent instances of paralytica dementia or other coarse brain disease. A few cases, clinically appropriate, were omitted on account of deficiency in the anatomical records. The group represents about 5 per cent of the autopsies performed.

II. Case Material.

We present 23 cases of insanity arising in the sixth or seventh decade. The clinical histories are much condensed, and the autopsy protocols are given in summary form. These cases are arranged according to a tentative grouping, adopted for convenience at the outset:

Alcoholic	2	cases.
Paranoic	5	"
Delirious	4	"
Maniacal	3	"
Depressed	9	"
Total	23	cases.

1. Alcoholic Conditions.

Case 1 is a man whose insanity developed at 57 and who died at 63, after five years in the hospital.

No history of neuroses, psychoses or intemperance in immediate family.

He was a bright companionable man in early life and since boyhood had been intemperate in the use of alcohol. Because of drinking habits, he failed in his business as undertaker one year before admission. He continued to drink hard and became much demented. He had no memory for recent events and showed well-marked fabrication.

On admission he was well nourished. Physical examination was negative excepting for sluggish pupillary reactions and diminished tendon reflexes. There was no history of lues.

He was neat and orderly in manner, and talked coherently in response to overtures, but there was practically no spontaneous production. He was disoriented for time, place, and persons. His memory was almost a blank, and he fabricated to supply deficiency. He was not hallucinated and never showed any well-defined delusions. He had no grasp on surroundings or any insight, and was always amiable. He never showed any interest in surroundings or engaged in any work or amusement of his own initiative. There was no apparent change in his mental condition before death.

Anatomical Diagnoses.

Chronic valvular endocarditis.
Calcification of bronchial lymph nodes.
Ulcerative colitis.
Slight aortic sclerosis.
Cysts of kidneys.
Weight of brain, 1250 grams.

Case 2 is a man whose mental trouble developed gradually at 63 and who died at 65, after one month in the hospital.

One aunt was insane. One of his four children died of convulsions. The family history was otherwise negative.

He was said to have had average mental ability and was of a cheerful temperament. All his life he had been addicted to excessive use of alcohol and had for over two years shown gradually increasing mental and physical failure with several attacks of hallucinatory delirium. One month be-

fore admission was said to have had a "shock" and to have been delirious and uncontrollable afterward.

On admission he was poorly nourished. Moist râles were heard over both backs. The heart was enlarged and arteries were thickened. Second aortic sound was loud and sharp. There were no murmurs. He walked with feeble, unsteady gait. There was fumbling in coordination tests. Hand grasps were feeble, right being slightly stronger. Knee jerks were very slight but equal. Pupils were equal and reacted normally. There was no history of lues.

He was feeble and remained in bed, showing no desire to rise. He was partially oriented. Speech was thick and indistinct. There was a fair memory for remote events but little for events from day to day. His spontaneous production was incoherent and rambling and vague, persecutory ideas were exhibited. Hallucinations were not pronounced. His emotional condition was unstable. He cried easily and was irritable. He gradually passed into a semi-comatose condition which lasted for a week before death.

The autopsy (five hours after death) showed the following conditions:

Hypostatic pneumonia with acute fibrinous pleuritis.
Slight aortic sclerosis.
Slight mitral sclerosis.
Marked sclerosis of cerebral vessels at the base.
Cardiac hypertrophy.
Chronic diffuse nephritis with cysts.
Chronic perisplenitis and pericholecystitis.
Sebaceous tumor of axilla.

Besides the marked basal arteriosclerotic changes, the intracranial tissues showed no other macroscopic signs of lesion, except a slight milkiness of the pia mater of the frontal region.

2. *Paranoic Conditions.*

Case 3 is a single woman, whose insanity developed when 56-58 and who died in the hospital, aged 68, after eight years' hospital residence.

There was a history of neurotic and insane relatives. One brother was insane from early life. As a young woman she had excellent social and educational advantages and was considered a bright, capable woman. For two to three years before admission she had been suspicious, disagreeable and deluded.

Physical examination negative save for a systolic murmur at apex. Mentally she was oriented, showed good appreciation of surroundings. There was no pronounced deterioration. She fancied God talked to her and carried on conversation with Him, basing predictions, and prophecies upon what was said to her. Her delusions were of persecutory tinge, not systematized and related largely to religious and sexual matters. She was very repellent in attitude, keen and sarcastic in her comments. She was able to read and comprehend. Often she was profane and obscene in her talk and

would be very disagreeable to some patients and unnaturally fond of others. There was no marked conduct disorder. There was a varying content to her delusions and a slowly increasing looseness of thought but to the last she was oriented and when annoyed would talk in keen, incisive and abusive manner. Two years before death weakness, numbness and tingling suddenly developed in right arm, and her writing, previously good, became illegible and her speech was thick but not aphasic. There was gradual improvement and no marked dementia following. Death occurred suddenly.

Anatomical Diagnoses.

Rupture of the heart wall due to infarction following thrombosis of posterior coronary artery.

Rupture of terminal branch of anterior coronary artery.

Hemopericardium with pressure upon lungs.

General arteriosclerosis (aortic, pulmonary (extensive), coronary, carotid, Circle of Willis, splenic, renal).

Sclerosis with calcification (thoracic aorta, coronary).

Hypertrophy of both sides of heart.

Slight chronic interstitial nephritis.

Chronic splenitis.

Multiple fibromyomata of uterus.

Slight cirrhosis of liver.

Chronic external adhesive pachymeningitis, more marked on left.

Slight chronic fibrous leptomeningitis (especially vertex and Sylvian regions).

Cysts of softening, right frontal cortex and of left side of pons.

Localized sclerosis of left precentral gyrus with induration of underlying white matter, most marked at junction of upper and middle thirds.

Slight focal cerebral atrophy (both Rolandic areas, left superior parietal lobule, olfactory bulbs and tracts, orbital gyri).

Slight marginal sclerosis of clival and cacuminal portion of cerebellum.

Calcified placques in pia mater.

Case 4 is a widowed woman aged 61 at admission. She was said to have been peculiar if not insane since the age of 50. Death occurred at 72 after 11 years in the hospital.

No family history obtainable. She had been a nurse. Persecutory delusions slowly developed accompanied by auditory hallucinations. She feared that men whom she heard about the house at night would kill her and kept a revolver for self-protection. The sexual element was prominent in her fears. At time of admission there was no marked deterioration. Auditory hallucinations were quite prominent for the first year or two but finally disappeared. Her delusions were not well systematized and she reacted by refusal of food, sullen, threatening attitude and occasional violence. There was considerable deterioration during last years in hospital. She

became disoriented, careless of appearance and finally untidy. Her delusions became less prominent and her manner more agreeable. Several years before death she became mute, resistive, showed muscular rigidity, *Schnauzkrampf*, and refused food at intervals.

Anatomical Diagnoses.

General arteriosclerosis, with atheromatous ulcers, extreme in lower two-thirds of aorta and in coronaries (not so marked in visceral vessels) of but a few mm. in diameter.

Fatty myocarditis.

Chronic fibrous myocarditis.

Multiple cardiac infarctions.

Arteriosclerosis of coronary arteries with practically obliterated lumen.

Chronic diffuse nephritis of interstitial and arteriosclerotic type. (Very marked macroscopical changes.)

Cerebral arteriosclerosis, as far as secondary branches of Circle of Willis.

Cerebral atrophy, with focal sclerosis in left occipital and right parietooccipital regions.

Numerous small cysts of softening in both corpora striata and in right optic thalamus.

Diffuse atrophy of cerebellum with marginal sclerosis.

Absence of diploë.

Chronic external pachymeningitis.

Weight of brain, 1110 grams.

Case 5 is a widowed woman whose insanity began at the age of 66 and who died at 72 after five years' hospital residence.

Her father died of cardiac trouble and her mother of "Bright's disease." One brother committed suicide and two others were insane.

She had average mental capacity. No drug or alcohol habit. A year before admission she was said to have been overcome by heat and to have had a convulsive seizure, the only one noted. Nearly one year later she began to think people were plotting to kill her son and herself. She fancied electric wires were put under the floor to give her shocks, talking machines placed at her window to call her names and X-rays turned on her and that she had been hypnotized.

On admission she was a well-preserved woman for her age. She was perfectly oriented and had a good memory. Auditory hallucinations were active. She talked coherently. Protested against commitment, but admitted she had acted peculiarly. Her persecutory delusions were of sexual character and she was frequently disagreeable and repellent or abusive and denunciatory. For weeks at a time she would appear exhilarated and unusually active and then she would be moderately depressed in appearance and more tractable. There was no marked mental deterioration and she had good memory and was oriented up to time of death.

The autopsy (20 hours after death) showed the following conditions:
Hypostatic pneumonia.
Tumor of omentum with metastases in mesentery and peritoneum.
Fatty heart, liver and kidneys.
Ascites and edema of legs.
Calcified nodules in upper lobe of right lung.
Cholelithiasis with obstruction of cystic duct and distention of gall-bladder.
Chronic external adhesive pachymeningitis.
Cerebral atrophy of the convexity especially in frontal and parietal regions.

Case 6 is a single woman whose mental trouble began at about 60. She died at 77 after 7 years in the hospital.

Her father died of "apoplexy" and mother of "old age." One brother and one sister died insane. She had a good education and had been a woman of good habits, but had been regarded as eccentric and peculiar for 10 years. During the larger part of this time she lived alone. She became suspicious and finally exhibited to her relatives many persecutory and depressive ideas. She thought the Catholics were injuring her, that electric light flashes were used as signals by those in league against her. She heard voices and strange noises around her house. Finally she thought she was lost and unfit to meet her Maker.

On admission, she was poorly nourished, but aside from moderate peripheral arteriosclerosis, her physical health was good.

She was fearful and apprehensive in manner but perfectly oriented and keenly interested. Memory was excellent. At times she showed slight insight. She showed extreme apprehensiveness and thought she was being poisoned by Catholic conspirators. Was afraid of nurses and was greatly worried and distressed. A few days after admission she became mute, resistive, rigid and refused nourishment for a short time and showed the same symptoms some months later. She developed peculiar hypochondriacal delusions, based upon visceral sensations, thought she was going to be made a pauper and then left alone. Her persecutory ideas were constant. Memory and orientation were preserved to the last of her illness. There was never any psychomotor retardation.

Anatomical Diagnoses.

Malnutrition.
Tuberculosis of lungs with cavitation.
Sacral decubitus.
Edema of ankles.
Brown atrophy of heart.
Fatty heart.
General and coronary arteriosclerosis.
Chronic fibrous pericarditis.

Atrophy of liver.
Chronic nephritis with cysts.
Chronic splenitis.
Chronic adhesive pleuritis.
Chronic peri-appendicitis.
Cerebral atrophy and pigmentation.
Cerebral edema.
Edema of pia mater.
Intracranial vessels normal, except for dilatation and sclerosis of right posterior communicating artery.
Brain weight 1130 grams.

Case 7 is a widowed woman whose insanity was first recognized five to 10 years before death, which occurred at 75 after seven months in the hospital.

Her father died at 60, her mother at 90. No history of insanity or neurosis in family. Fairly capable woman. Had a family of three children. At age of 55 had an attack of inflammatory rheumatism and was taken to a city almshouse where she remained until transferred to the hospital, as she was crippled by rheumatism. For five to 10 years she had been deluded, suspicious and disagreeable.

On admission she weighed 76 pounds, fingers were contracted and joints enlarged and deformed. Nothing else of interest in physical examination.

She was quiet, orderly and neat in care of person. Orientation was perfect, her memory was good, school knowledge was retained, she had a good grasp on surroundings and fair knowledge of current events. Her productions were coherent. Auditory hallucinations were constant and were of abusive content. Her delusions were not systematized but were always persecutory in character and she talked about them freely. At times she was disagreeable in manner and would scold about her fancied abuses. She kept interested in surroundings and there was no pronounced mental deterioration at time of death.

Anatomical Diagnoses.

Bronchopneumonia.
Chronic diffuse nephritis.
Chronic passive congestion of liver.
Acute splenitis.
Chronic leptomeningitis.
Sclerosis of basal cerebral vessels.
Unequal pupils.
Chronic fibrous pericarditis (milk spot).
Scarring of apices of lungs.
Enlargement of retroperitoneal lymph nodes, slight.
Weight of brain, 1180 grams.

3. Delirious Conditions.

Case 8 is a man, who was 55 years old when admitted at Danvers.

His family history was not obtained. Friends stated that he had been a hard-drinking laborer who had never been insane. He had worked until a short time before admission.

There was no history of lues. He was poorly nourished. Urine showed cloud of albumin, sp. gr. 1024. Sediment contained broad and narrow hyalin casts, blood and pus corpuscles. The heart was much enlarged and second aortic sound was loud and sharp. He was feeble, tremulous, and unable to stand unassisted. There was no paralysis. Knee jerks were absent. Pupils were equal. Light reactions were not determined. There was a questionable history of specific lesion three years before.

He was completely disoriented. Attention could be held and he gave relevant replies. He reacted to visual and auditory hallucinations by feeble groping restlessness and broken, thick speech. No memory for recent events and that for earlier periods was fragmentary. At times he showed partial insight. There was no improvement. He took liquid diet freely. On the ninth day his rectal temperature which had previously been within normal limits fell to 91.4. Within 24 hours it slowly and gradually rose to 101.8. Physical examination showed nothing new. He became more feeble and stuporous and showed tendency to fabricate when aroused. He died on the 19th day after commitment.

Anatomical Diagnoses.

Small scar of penis.
Dilatation of pupils.
Emphysema of lungs.
Chronic adhesive pleuritis of both sides, posteriorly.
Moderate mitral sclerosis.
Moderate sclerosis of aortic arch.
Ecchymoses of fundus of stomach.
Chronic diffuse nephritis.
Aortic sclerosis with calcification of abdominal portion.
Calvarium shows little diploë.
Chronic external adhesive pachymeningitis.
Chronic fibrous leptomeningitis.
Marked edema of pia mater, posterior region.
Weight of brain, 1350 grams.

Case 9 is a man 56 years old, who had never shown mental symptoms until he was delirious following an acute otitis media six years ago.

One sister was said to be "peculiar" and another had "nervous prostration" in middle life. He was a man of fair ability, steady in habits and worked as a drug clerk for 32 years. Six years ago following his ear trouble he had inflammatory rheumatism and had not been well physically since then. He had not worked for two years. He became unreasonable

in conduct and failed physically. Two weeks before admission he was unconscious for two hours and since then was "nervous and restless."

On admission he was well nourished. The urine showed cloud of albumin. Sp. gr. 1022. Sediment contained hyalin casts, leucocytes, and calcium oxalate. The heart was greatly enlarged. The second aortic sound was loud and second sound at apex was reduplicated. Arteries were thickened and pulse was irregularly intermittent. There was no paralysis. Hearing and vision were slightly defective. The pupils reacted promptly to light and knee jerks were equal and lively.

On admission he was imperfectly oriented. His school knowledge was imperfectly retained. Memory was greatly impaired and defects were covered by romancing. He constantly reacted to auditory hallucinations. He could not give any intelligible account of past events. There was an almost constant fumbling restlessness and he was untidy and feeble. He died nine days after commitment.

Anatomical Diagnoses.

Cardiac dilatation.
Acute myocarditis.
Hypostatic pneumonia.
Chronic perisplenitis.
Acute splenitis.
Acute bronchitis.
Obliterative fibrous pleuritis, right.
Aortic sclerosis.
Chronic external adhesive pachymeningitis.

Case 10 is a woman 55 years old who showed mental symptoms for the first time about five months before admission.

No family history was obtainable. She had been temperate. For six months or more she had suffered from kidney and heart disease.

On admission she was poorly nourished. There was general anasarca. Abdominal cavity contained fluid. Moist râles were heard over both backs. Heart was dilated, action was feebly intermittent, and sounds were fluttering and indistinct. The soft murmur heard could not be timed. The urine showed sp. gr. 1018, and contained albumin and hyalin casts. She was unable to stand. There was no paralysis. Knee jerks were equal and lively and pupils reacted promptly to light and were equal. There was great dyspnœa. She was completely disoriented and unable to recall recent events or to give any coherent history. She could not perform simple mental arithmetic. There was no insight. Visual and auditory hallucinations produced apprehensive reaction. She would beg for protection from those whom she thought would shoot or injure her. She made no effort to care for her person and was feebly restless until death occurred suddenly on the 12th day in hospital.

Anatomical Diagnoses.

General anasarca.
Cardiac dilatation.
Chronic passive congestion of liver, spleen, and kidneys.
Chronic diffuse nephritis.
Weight of brain, 1300 grams.

Case 11 is a man 70 years old who had showed no previous mental symptoms excepting two short delirious episodes within the past three years.

His father died of "rheumatism" at 80; his mother at 60 of unknown cause. A maternal aunt became insane at age of 50 and did not recover. Patient had been an industrious man of good habits. There was history of inflammatory rheumatism in early life and several milder attacks later. He had done no work for three to four years before admission. He had shown symptoms of present trouble for two months. When examined he was poorly nourished, limbs were edematous. Skin was dry and scaly. There was fluid in right chest. The heart was much dilated, arteries were thick, pulse was feeble and irregular, and a loud, musical systolic murmur was transmitted to the axilla. The urine showed sp. gr. 1022, 10 per cent albumin. Sediment contained broad granular and hyalin casts, pus cells and uric acid crystals. Neurological examination was negative. He was disoriented. Memory was gone for recent events, but at times he would exhibit fair recollection of early life. He could not write or perform mental arithmetic with any accuracy. At intervals he showed some insight. He became more restless and apprehensive and was totally unable to converse intelligibly and died in a few days.

Anatomical Diagnoses.

Focal sclerosis of basilar artery and of one Sylvian artery.

Cysts of softening in lower part of right centrum ovale external to tip of right lateral ventricle.

4. Maniacal Conditions.

Case 12 is a woman whose insanity developed at age of 52 and who died in the hospital at 69.

Both her parents died in extreme old age. One sister was peculiar from early life and considered insane, though never requiring commitment.

She had a normal development. At 25 she was married and had five children, one dying in infancy, another at the age of 23. The menopause occurred uneventfully at 40. From the age of 52 she was depressed or exhilarated, according to the history, much of the time. The attacks were not of regular duration. At one time she was well enough to live comfortably at home for three years. In her excitement she was loquacious disorderly, and elated. In the opposite condition she showed retardation, depression and difficulty in thinking. In both states she remained oriented until shortly before death and there was no marked dementia.

At time of admission, one year before her death, she was anemic and poorly nourished. Heart was slightly enlarged. Arteries were thickened. Urine, normal. Neurological examination was negative.

Her countenance was sad and she was apprehensive and bewildered. She remained in bed, moaning unintelligibly and was untidy. Answers to questions were usually in monosyllables and much of the time she was mute. For a few days at a time she would appear cheerful and talk volubly, showing a broken flight. At these times she would show fair memory and was oriented. For some months before her death she was untidy, depressed, retarded, and showed a tendency to self-accusation. She refused nourishment and failed slowly.

Anatomical Diagnoses.

Emaciation.

Hypostatic pneumonia with acute sero-fibrinous pleuritis, and (by extension) acute mediastinitis and pericarditis.

Small hemorrhages in gastric mucosa.

Acute splenitis.

Chronic diffuse nephritis.

General arteriosclerosis (aortic, coronary right anterior choroid, and pulmonary).

Chronic myositis with pigmentation (thorax).

Brown atrophy of heart muscle.

Mitral sclerosis.

Chronic fibrous endocarditis.

Chronic gastritis.

Chronic external adhesive pachymeningitis.

Chronic leptomeningitis (over sulcal vessels at vertex).

Deficiency in left vertebral and right posterior communicating arteries.

General encephalomalacia and myelomalacia.

Frontal, orbital, and central sclerosis.

Case 13 is a man who became insane at 63 and who died at 67 after two years' hospital residence.

His father died of pneumonia at 76 and his mother of tuberculosis at 28. A brother and sister also died of tuberculosis. There was no history of nervous or mental disorder in family.

He had been a hard-working farmer and made a good living for his family. He had been rather moody and quiet in temperament. Two years before admission he slowly developed an unreasonable attitude towards family, an increasing activity, a garrulous flight of expansive ideas and was sent to a private hospital. Then he became disorderly, destructive, and violent.

On admission he was in excellent physical condition. He had a keen, alert countenance. Orientation perfect and memory was excellent for recent and remote events. He had no hallucinations. There was no insight.

He talked incessantly for hours in the night simply to annoy others, which he would consider a great joke. He would write long abusive diatribes about the hospital, physicians, and nurses and announced his purpose of forming a league to reform hospitals. He would become so disorderly that seclusion was demanded and then the incident would be recorded as evidence and he would declare that his unbearable conduct was a part of his scheme. He was always coherent in talk and writing and his flight was orderly. Elation and psychomotor activity were constant. His conduct disorder was out of proportion to symptoms of intellectual impairment.

Anatomical Diagnoses.

Hypertrophy of heart.
Fatty heart.
Ascites.
Chronic external adhesive pachymeningitis.
Chronic fibrous leptomeningitis, especially along vessels.
Moderate basal arteriosclerosis.
Frontal cerebral atrophy.
Focal area of softening of paracentral lobule.
Weight of brain 1310 grams.
Ecchymoses of right hip and of right chest behind.
Multiple fractures of right humerus.
Hemorrhage of retroperitoneal tissue of right side.
Hemorrhage of retroperitoneal tissue about bladder and rectum, right side.
Emphysema and edema of lungs.
Emphysema of pleural adhesions and of mediastinum on right side.
Fractures of ribs, upper six ribs.
Fracture of right ilium and os pubis.
Hemorrhage of chest near attachment of hepatic ligaments.
Wound of right kidney.

Case 14 is a woman who suddenly became insane at the age of 57 and who died at 70 after 13 years in the hospital.

No reliable family history. She is said to have been well until a few weeks before admission when she became restless, talkative, and disorderly.

Her physical health on admission was good.

She was active, mischievous, irritable and disorderly. There was no marked deterioration. She was oriented. There was marked distractibility and her conversation was flighty and broken. Excepting for short outbreaks of irritability she was constantly elated. The condition was constant to the end.

Anatomical Diagnoses.

Marked emaciation.
Sacral decubitus.
Bronchopneumonia.

Interstitial nephritis.
Chronic fibrous myocarditis.
Chronic passive congestion of spleen, and chronic perisplenitis.
Varicose veins of legs.
Chronic endocarditis, mitral and tricuspid.
Ascites.
General tubercular peritonitis.
Tuberculosis of intestines.
Tuberculosis of liver.
Tubercular adenitis of peri-bronchial lymph nodes.
Sinus into right knee joint.
Chronic patellar bursitis, right.
Superficial wound of left thigh.
Sub-acute cholecystitis.
Chronic external adhesive pachymeningitis.
Weight of brain, 1110 grams.
Chronic obliterative pleuritis, right.

5. *Depressed Conditions.*

Case 15 is a man aged 58 who showed first evidence of mental trouble at 56 and who died at 58, after four months' in the hospital.

His father died of apoplexy at 70, and mother at 80 of unknown cause. No history of neurosis, psychosis or intemperance in his family.

He never used alcohol, and had been a hard-working man of frugal habits. For two years before admission, he had exhibited an increasing hypochondriacal depression. Twice he had persuaded surgeons to perform an exploratory laparotomy, to no effect. He became more restless, agitated and suicidal and was committed.

On admission, he was poorly nourished. Heart was enlarged, arteries moderately thickened, pulse feeble, sounds were very faint. Urine contained a trace of albumin and was otherwise normal. Neurological examination was negative.

His expression was sad and hopeless. He was constantly groaning and talking volubly. Orientation was perfect and memory was not impaired. No hallucinations observed. He talked freely about his feelings of unreality and nihilistic ideas. The following excerpts show their character:

"There it is. I am all ablaze. I am burning, burning. Every breath that comes out of my mouth is as hot as if it were coming from a steam-engine. I burn just like a fire. It must be Hell. I will last as long as the earth. My God, man, look here. I am all afire. Oh, burning, burning, and I can't take water. Water don't check my thirst. I tell you one thing, when you talk to me, you are talking to Hell. I am craving for nuts, apples, milk, everything, and I can't take them. I've got no stomach and it is no use to put them in my mouth. I am in Hell. I am all afire. This will never take my life. Oh, this is pain. It biteth like a serpent and stingeth

like an adder. You can shoot me full of bullets and I won't die. My spirit sticks my throat together. I would give a million dollars if I had a disease which would kill me. Everybody will be dead and gone, the world will have passed, these trees will be gone and this building will be rotted down and I will still be here."

Aside from physical failure, there was little change in his condition before death.

Anatomical Diagnoses.

Pulmonary tuberculosis, small old focus.
Pulmonary hypostasis, slight.
Chronic diffuse nephritis.
Slight aortic and coronary sclerosis.
Weight of brain, 1370 grams.

Case 16 is a widowed woman about 65 years old, whose mental trouble began about six months prior to death, which occurred after three months in the hospital.

Her father died at 75 of rheumatism her mother at 73 of pneumonia. One brother died insane and the family history was otherwise negative.

She was a mill operative and nurse before marriage, at 46. Menopause occurred uneventfully, at 50. For some months, she had been nursing an invalid husband, who died. She became depressed, restless and came to the hospital as a voluntary patient.

She was fairly well nourished. Heart was slightly enlarged. Arteries were thickened and there was a well-defined arcus senilis. Pulse regular; second aortic sound was sharp and clicking. Urine showed hyalin casts and albumin. Aside from subjective sensations, neurological examination was negative.

She was much depressed, sleepless and agitated. Orientation was perfect at first and school knowledge was retained. Memory for early events was good, but somewhat impaired for recent periods. Auditory hallucinations developed and voices of her family were heard, later she saw people who had been raised from the dead. Her attention and memory showed more impairment and feelings of unreality developed and she talked about them constantly.

"Oh dear. Why don't they do something so I won't suffer. See my legs and see my eyes. I am turning into an animal. Blotches have come on my skin, it is all shrunk up and my eyes look fierce like a squaw's eyes. Send me home, I can't stand it. Why can't you put something through me to kill me. Oh, my God. I've got to be like a bear. Why am I so crazy? Oh, dear. Why am I to be killed?"

For short periods, her attention could be held and she had partial insight, but she grew rapidly worse, becoming less communicative and refusing food before death.

Anatomical Diagnoses.

Nutrition poor.
Surgical incisions of right forearm, left forearm and right knee.
Slight coronary arteriosclerosis.
Slight sclerosis of aortic arch.
Fatty liver.
Hyperemia of spleen.
Slight edema of lungs.
Chronic interstitial nephritis.
Smooth globular, subcapsular encapsulated tumor of right kidney.
Submucous fibromyoma of uterus.
Subperitoneal fibromyoma of uterus with calcification.
Polyp extending from the upper wall of uterus to vagina.
Slight chronic external adhesive pachymeningitis.
Focal sclerosis of right Sylvian artery (one patch).
Weight of brain 1220 grams.

Case 17 is a man who first became insane at 65 and who died within six months.

His father died at 77 of cardiac disease and his mother at 67, after three years of senile dementia.

He served in the Civil War and for 35 years had worked as an operative. He was a man of pleasant disposition and industrious and temperate habits. When 61, he had grippe and typhoid fever. Was delirious during both illnesses. He worked steadily until nine weeks before commitment, though he had been sleeping poorly, losing weight and exhibiting depression for some weeks. He fancied that his family would starve and freeze, that he was decreasing in size, and that others were growing larger. He refused nourishment.

On admission, he was emaciated. Heart was not enlarged; second aortic sound was loud. Pulse was feeble and arteries were soft. There was a faint arcus senilis. The urine contained no albumin or casts. Reflexes were equal and lively. Muscular movements were well performed. There was no history of lues.

He was oriented for time, place and persons and showed good memory. School knowledge was well retained though answers to tests were given accompanied by protestations that he could not tell, that he had no brains, etc. He talked sharply in almost petulant manner, though showing depression and agitation. His spontaneous productions are shown by the following:

"I've got no brains and I can't talk and you are going to make out a wrong report. I've got no heart and no stomach and I can't swallow. I haven't any feelings." At another time, when addressed, he said: "Yes, you are all great big men and so strong, you must weigh over 400 pounds, and I am so small you can't see me. I'm freezing to death and you cover

me with great heavy blankets. I would not burn if you threw me in the hottest furnace, but I can't suffer because I have no brains."

He refused food and failed rapidly, showing similar symptoms to the end.

Anatomical Diagnoses.

Nutrition poor.
Chronic adhesive pleuritis of both apices.
Thrombosis of right auricle.
Bronchopneumonia of both lower lobes.
Embolism of primary branches, of left pulmonary artery.
Chronic perisplenitis.
Suppuration of retroperitoneal tissue (pneumococcus and other bacteria), probably due to thrombosis of left renal veins.
Pyelitis.
Ureteritis.
Cystitis.
Vesiculitis.
Moderate aortic sclerosis.
Thrombosis (3 x 2 x 1 cm.) of aorta.

The above case has been previously reported in full by Mitchell and Southard, Melancholia with Delusions of Negation: Three Cases with Autopsy, *Jour. Nerv, Mental Disease,* May, 1908.

Case 18 is a married woman, whose first mental trouble occurred two months prior to death, at 58, three weeks after admission to hospital.

Her father died of tuberculosis at 68, and her mother in middle life of some intestinal trouble. Four brothers and sisters alive and well. No history of neurosis, psychosis, or intemperance in family.

She was of a bright, cheerful temperament and was married at 28. She had no children. The menopause occurred uneventfully at 49. Her mental trouble began with worry, sleeplessness, feeling of poverty, hallucinations and development of depressive persecutory ideas.

On admission, she was poorly nourished. Heart was not enlarged. Arteries were thickened. Pulse was small. Urine showed albumin and hyalin casts. Tendon reflexes exaggerated.

She was apprehensive and inactive. There was little spontaneous speech though she moaned and sighed. Orientation was imperfect, but her memory was good. Attention was held with difficulty. Questions were answered after initial delay of 10 to 30 seconds.

Q. "Are you afraid?"
A. "Yes, of everything."
Q. "What makes you afraid?"
A. "Oh, I don't know, lots of things. I am afraid something is going to happen to me."
Q. "Why can't you stay in bed?"
A. "Because I am afraid."

Her depression and restlessness increased but the character of her productions remained unchanged until death.

Anatomical Diagnoses.

Acute enteritis, in places diphtheritic.
Bronchopneumonia, slight.
Chronic diffuse nephritis.
Thrombosis of branch of right middle cerebral artery.
Chronic fibrous pleuritis.
Cysts of choroid plexus.
Aortic sclerosis.
Weight of brain, 1330 grams.

Case 19 is a man whose mental trouble first developed at 70. He died at 71 after eight months in the hospital.

The family history was negative. He had used liquor freely until within a few years but not sufficiently to produce recognized mental symptoms. For about one year, he had been depressed and after, threatened suicide. Finally he cut his throat and was committed one week later. During this period, he was said to have been "clear and rational," excepting on a few occasions when he appeared unusually disturbed and showed suicidal tendencies.

On admission, he was pallid and poorly nourished. There was a suppurating, superficial wound. There were moist râles and dulness at both apices. Heart was not enlarged. Arteries were hardened and arcus senilis was marked. Urine contained a few hyalin casts, but no albumin.

He appeared depressed. Talked responsively in low, soft tones with some delay and few words. He was fairly well oriented. There was slight memory impairment for both recent and remote events. He was not hallucinated. Partial insight was displayed and he was thankful that the suicidal attempt was unsuccessful. He showed ill-defined persecutory ideas and worried about his family relations, but showed no peculiar reaction to his surroundings. His depression was constant and he became more reticent. He was always orderly in conduct and neat in habits. Death occurred after gradual physical failure.

Anatomical Diagnoses.

Marked emaciation.
Scar of neck at upper border of cricoid cartilage.
Chronic fibrous pleuritis, left.
Chronic obliterative pleuritis, right.
Milk patch of left ventricle and left auricle.
Slight mitral sclerosis.
Abscesses of right apex.
Chronic tuberculosis of lungs with acute fibrinous pleuritis of right lung.
Diverticula of descending colon.
Chronic perihepatitis of left lobe.

Scars of kidneys.
Hernia of left side of bladder.
Chronic external adhesive pachymeningitis.
Basal cerebral arteriosclerosis.
Focal cerebral atrophy (opercular region).
Chronic internal hydrocephalus.
Weight of brain, 1240 grams.

Case 20 is a man whose mental trouble began at 52 and who died three months later, after two weeks in the hospital.

Insanity and intemperance in the family were denied.

He had been a capable bookkeeper of rather eccentric manner and solitary habits. He was not intemperate. Following hard work and some business worry, he tried to throw himself in front of a moving train a month before his admission. For a few days he was excitable and depressed but soon improved. He heard voices talking to him and he was committed.

He was poorly nourished. Physical examination was negative, excepting inequality of knee jerks. Urine was normal.

His movements were feeble and his expression worried, and apprehensive. He talked slowly, after making long pauses; voice was low and indistinct. He was partially oriented. Memory for recent and remote events good. He had a good appreciation of surroundings. Auditory hallucinations were prominent and of frightful content and were reacted to by fear and apprehension. He was self-condemnatory; blamed himself for the many losses of his employers; thought he would communicate disease to those about him. He wanted to die as there was no hope for him. He showed restless agitation, would not remain in bed; refused proper food and became uncommunicative before death.

Anatomical Diagnoses.

Marked emaciation.
Dilatation of pupils.
Chronic fibrous pericarditis.
Aspiration pneumonia with acute fibrinous pleuritis.
Old scars of right kidney.
Chronic perihepatitis with adhesions to peritoneum.
Chronic peri-appendicitis.
Enlargement of mesenteric lymph nodes.
Adhesions of scalp to calvarium.
Marked chronic external adhesive pachymeningitis.

Case 21 is a man whose depression was first observed at 51 and who died at 54 after two years' hospital residence.

His father was living. His mother was neurotic and died of consumption at 58. One maternal uncle was an imbecile, another was intemperate. One brother was neurasthenic and intemperate.

He had average ability, was industrious and temperate. His manner was quiet and reserved and he was inclined to worry over trifles. For two years he had had financial trouble and for six months had been depressed and shown a tendency to self-accusation and had been afraid he would injure family or himself.

On admission, he was pallid and emaciated. There was evidence of pulmonary tuberculosis. Heart was enlarged and there was a thrill and presystolic murmur at the apex. No history of lues. Urine was normal. Inequality of knee jerks was the only thing of interest in neurological examination.

His expression was sad and dejected and his movements were slow and feeble. Orientation was perfect and memory was unimpaired. Auditory hallucinations were noted. He said his conscience talked to him, once remarking, "It is a mockery for me to pray, and when I try, my conscience goes to work and gives me such a wild feeling I don't know what to do." Later, he heard voices of his relations calling to him and saw faces. He blamed himself and thought he had sinned unpardonably and caused others to suffer. Fancied he could see fire and smoke rising from Hell and that he heard the voice of God summoning him to appear and take his punishment. He rarely took the initiative in talking. His voice was low and indistinct. He was neat and orderly in conduct. Three months before death, a tubercular mediastinal abscess was drained. He failed physically and his depression, hallucinations, apprehensiveness, and self-accusation remained unchanged. Memory and orientation good to the end.

Anatomical Diagnoses.

Pulmonary tuberculosis, far advanced on both sides, with cavitation and caseation.
Chronic tuberculous pleuritis.
Anomaly of left olfactory tract.
Marked emaciation.
Operation wounds on anterior aspect of chest.
Subcutaneous sinus on left aspect of chest.
Arteriosclerosis of coronaries and of aorta, slight.
Chronic passive congestion of liver.
Weight of brain, 1410 grams.

Case 22 is a woman who was well until age of 55 and who died at 59 after four years in the hospital.

Her mother died of "softening of the brain" at 75, and her father at 50 of unknown cause. One paternal cousin was insane. Three brothers and sisters in good health. She was married at 19 and had one living child. Menopause occurred uneventfully at 40. She never had any serious illness. For two months, before admission, she was restless and showed increasing agitation, pacing to and fro, picking at her clothing, whispering to herself. She exhibited self-depreciation, cried and talked of suicide.

When admitted, she was emaciated. There was a slight peripheral arteriosclerosis. Heart was not enlarged. Urine contained albumin and granular casts.

She presented an appearance of dejection, talked in a low, almost indistinct tone. There was little motor activity. She would sit for hours in contracted attitudes and occasionally pace slowly about in aimless manner, wringing her hands and moaning. Orientation was perfect and memory was good. Auditory hallucinations were transitory. Her attention could not be diverted and she had distressing delusions; imagined that she had a loathsome disease, that she had been a wicked woman, that a terrible fate had overtaken her relatives. Distressing nocturnal, visual hallucinations developed and her condition is well shown by an occasional outburst. "I am under a terrible influence. I can't help it. If I only could see things as you do. I have done wrong. I was born under a curse. I didn't know my mother was diseased until I came here. I know I have got the bad disorder. I am not going to eat any more. I don't want to live. Please don't do anything for me, doctor, I want to die, but I don't want to be tortured to death. Can't you let me die quickly?" She became more depressed and retarded; would rarely speak spontaneously, except to beg that she might die. She would attempt to empty her stomach after forced feeding. She was oriented and had fair memory until her death.

Anatomical Diagnoses.

Edema of left hand.
Acute purulent pericarditis.
Slight chronic fibrous pleuritis, posteriorly.
Hydropericardium.
Brown atrophy of heart.
Hypertrophy of heart.
Bilateral bronchopneumonia.
Liver weight, 760 grams.
Renal atrophy.
Moderate aortic sclerosis.
Weight of brain, 1040 grams.

Case 23 is a man who developed a depression at 64, attempting suicide, made a fair recovery and died at the hospital eight years later.

His family history was not obtainable.

He had used liquor freely in early life but had never been insane and for 10 years had been temperate. For some months, prior to admission, he had been very despondent and unable to work. He filled his pockets with rocks and jumped into the river. After being rescued, he was brought to the hospital. At that time he was considered to be a case of "acute melancholia." It appears from the incomplete record, that he recovered in a

few months. He was a good machinist and desiring to remain at the hospital, he was allowed to work for a small compensation and for eight years prior to death, he showed no evidence of mental derangement.

The autopsy (three hours after death) showed the following conditions:

Carcinoma of stomach with secondary nodules in liver.
Miliary tuberculosis of peritoneum and parietal pleura.
Emaciation.
Anemia.
Chronic obliterative pleuritis, left lung.
Chronic adhesive pleuritis, left apex.
Fibrous aortitis about origins of intercostal arteries.
Slight chronic fibrous leptomeningitis.

III. Clinical Summary.

In this summary we have included some general statistical features, but have paid special attention to the diagnostic points which tend to separate these cases from arteriosclerotic and senile atrophic cases.

Sex.

There are 12 male, 11 female patients in our series. Both alcoholics were male. The five paranoics were female. Three of the delirium cases were male, one female. Two of the maniacal cases were female, one male. Six of the depressed cases were male, three female. If the maniacal and depressed cases are placed in one group, there are seven male cases, five female.

Hereditary Factors.

Hereditary factors may be excluded (with the usual reservations for these State hospital patients), in Cases 1, 7, 13, 15, 18, 19, 20; occur but are not especially prominent in Cases 2, 9, 11, 12, 16, 17, 22; are well marked in Cases 3, 5, 6, 21; and are impossible to affirm or deny in Cases 4, 8, 10, 14, 23.

A decision concerning these factors is obviously rendered difficult by the age of the patients and the dispersion of parental acquaintances.

The group of cases with hereditary factors not prominent contains "one aunt insane" (Case 2), "peculiar sister" and "sister with nervous prostration" (Case 9), "maternal aunt insane at

50" (Case 11), "peculiar sister" (Case 12), "brother insane" (Case 16), "mother senile dement three years" (Case 17), "paternal cousin insane" (Case 22). In the group with marked hereditary factors, including Case 3 (neurotic and insane relatives, brother insane), Case 5 (two brothers insane, third a suicide), Case 6 (brother and sister insane), Case 21 (mother neurotic, one maternal uncle imbecile, another intemperate, brother neurasthenic and intemperate), all cases appear to show the probability of hereditary factors emerging in brothers or sisters of the patients in question.

Hereditary factors of more or less importance are present in 47 per cent of the series as a whole, or in 74 per cent of those cases in which reliable histories were obtainable.

Antecedent Factors.

Alcoholism of excessive grade appears to play a part in two cases (1 and 2), possibly also in three more (8, 19, 23), all male cases.

Arteriosclerosis was clinically recognizable in 10 cases, including the following (with age at examination):

2 æt. 65, 6 æt. 70, 9 æt. 56, 11 æt. 70, 12 æt. 68, 15 æt. 58, 16 æt. 65, 18 æt. 58, 19 æt. 70, 22 æt. 55 (slight). Of these cases two only (Cases 2 and 19) gave clinically recognizable arteriosclerosis *together with* a history of excessive alcoholism.

Heart disease was clinically recognized in nine cases (2, 8, 9, 10, 11, 12, 15, 16, 21).

Kidney disease was clinically recognized in nine cases (8, 9, 10, 11, 15, 16, 18, 19, 22).

Heart and kidney disease combined occurred in six cases (8, 9, 10, 11, 15, 16).

Arteriosclerosis, heart disease, and kidney disease combined occurred in four cases (9, 11, 15, 16).

Inflammatory rheumatism is prominent in two histories (7, 11); "grippe and typhoid fever" four years before onset, Case 17; otitis media followed by delirium, Case 9.

Of social factors, business troubles appear in Cases 20 and 21, exhaustion by nursing, Case 16.

Age at Onset and Duration.

		Age at Onset.	Age at Death.	Duration.
1.	M.	57	63	6 y.
2.	M.	63	65	2 y.
3.	F.	56-8	68	10-12 y.
4.	F.	50	72	22 y.
5.	F.	66	72	6 y.
6.	F.	60	77	17 y.
7.	F.	65-70	75	5-10 y.
8.	M.	55	55	brief.
9.	M.	50	56	6 y.
10.	F.	55	55	5 m.
11.	M.	67	70	3 y.
12.	F.	52	69	17 y.
13.	M.	63	67	4 y.
14.	F.	57	70	13 y.
15.	M.	56	58	2 y.
16.	F.	65	65	6 m.
17.	M.	65	65	6 m.
18.	F.	58	58	2 m.
19.	M.	70	71	1 y.
20.	M.	52	52	3 m.
21.	M.	51	54	3 y.
22.	F.	55	59	4 y.
23.	M.	64	72	8 y.

Character of Onset.

The onset was gradual in Cases 1, 2, 3, 4, 6, 7, 10, 12, 13, 15, 16, 17, 19, 21, 22, 23—sixteen cases.

The onset was sudden in Cases 5, 8, 9, 11, 14, 18, 20—seven cases.

Both alcoholics, four of five paranoic cases, one of four delirious cases, two of three maniacal cases and seven of nine depressed cases had a gradual onset.

One of five paranoic, three of four delirious, one of three maniacal, and two of seven depressed cases had a sudden onset. Brief characterizations of onset are:

1. Business failure due to growing amnesia and fabrications.

2. Gradual mental and physical failure, hallucinatory attacks.

3. Unsystematized persecutory, religious and sexual delusion formation.

4. Unsystematized persecutory sexual delusions and auditory hallucinations.

5. Single convulsive seizure ("overcome by heat"). Persecutory delusions one year later.

6. Eccentric and peculiar, persecutory delusions, depressive ideas, auditory hallucinations (?).

7. Persecutory delusions, auditory hallucinations.

8. Unknown. Physical weakness. Visual and auditory hallucinations.

9. Delirium following otitis media, inflammatory rheumatism, physical failure, amnesia, fabrication, unreasonable conduct.

10. Cardiorenal disease.

11. Delirious episodes.

12. Depression and exhilaration in attacks of irregular duration.

13. Slowly developing unreasonable attitude.

14. Psychomotor excitement.

15. Increasing hypochondria.

16. Restless depression while nursing husband.

17. Insomnia, loss of weight, depression.

18. Insomnia, worry, feeling of poverty, hallucinations, persecutory delusions.

19. Depression and suicidal threat.

20. Hard work and business worry.

21. Financial trouble, self-accusations.

22. Psychomotor excitement with depressive ideas.

23. Despondency and suicidal attempt.

General Clinical Features.

The signs of *peripheral* motor or sensory *disorder* were very few in this series. Case 9 (with defective hearing and vision) was the only case of sensory disorder at all marked. Case 1 showed sluggish pupillary reactions and diminished knee jerks. Case 2 showed ataxia and diminished knee jerks. Case 8 showed knee jerks absent; Case 18, knee jerks exaggerated; Cases 20 and 21, knee jerks unequal.

There are also few instances giving evidence of *focal brain lesion*. Case 3 developed weakness of one arm, with difficulty in

writing and thick speech eight to 10 years after onset of mental disease and two years before death. Case 2 is said to have had a "shock" one month before admission, two months before death. Case 5 is said to have had a convulsive seizure at 65, six years before death. Case 9 is described as having an attack of unconsciousness 23 days before death, followed by nervousness and restlessness.

Hallucinatory disturbances form a feature in 13 of the 23 cases (56 per cent), purely auditory in eight cases (3 (?), 4, 5, 6, 7, 9, 18, 20) and auditory combined with visual in five cases (8, 10, 16, 21, 22). In the other cases, naturally, hallucinations may have been present, but are uncertain. The auditory hallucinations of Case 4 disappeared after two years. Those of Case 18 were features of the onset only.

Delusions characterized, in addition to the five paranoics (3, 4, 5, 6, 7), also Cases 2, 12, 15, 16, 17, 18, 19, 20, 21, 22, that is in 15 cases (65 per cent). Twelve of these showed allopsychic delusions, of which seven (2, 3, 4, 5, 7, 18, 19) showed such delusions in a comparatively simple or uncombined form (delusions of persecution), three (15, 16, 17) showed them commingled with various autopsychic and somatopsychic delusions of a metaphysical sort (feelings of unreality and nihilistic ideas), one (4) developed visceral delusions in addition to allopsychic, and one (21) showed a slight admixture of allopsychic delusions with self-accusatory ones. Three cases (12, 20, 22) show self-accusatory delusions in comparatively pure form. The perseçutory delusions in three female cases (3 æt. 56-8 at onset, 4 æt. 50 at onset, 5 æt. 66 at onset) had a sexual tinge. Cases 3 and 6 showed delusions of a religious character. In Case 18 there was onset with worry, insomnia, feeling of poverty, and persecutory ideas; but in the hospital the picture changed or developed into a state characterized chiefly by fear.

Amnesia for recent events characterized Cases 2, 11, and 16 (slight); for both recent and remote events, Cases 1, 8, 9, 10, 19 (slight). Attempts to supply the gaps in memory by fabrications characterized 1, 8, and 9; two of these cases (1 and 8) had alcoholic histories; but the third (9), a drug clerk for 32 years, was a man of originally fair ability and steady habits.

Disorientation in greater or less degree marked the course of eight cases (1, 2, 4 (late), 8, 9, 10, 11, 18), that is in all the cases provisionally called "delirious" (8, 9, 10, 00), in 1 and 2 (alcoholic dementia), 4 (of late development in a case with much cerebral arteriosclerosis and atrophy), and 18 (orientation neglected through absorption by fear?).

Seven of the 23 cases could perhaps be placed in the manic-depressive group. Cases 5 and 12 had attacks of exhilaration and depression. Case 14 remained in a constant elation with psychomotor restlessness, distractibility, flight of ideas and words, for 13 years, till death at 70. Cases 18, 20 and 22 showed depressions, characterized by retardation. Case 23 recovered from his single attack of depression with suicidal attempt at 64, was employed at the hospital as machinist, and died at 72 of tuberculous peritonitis.

Katatonic features were strikingly rare. Two cases of the "paranoic" group (4 and 6) at times showed katatoniform signs which were possibly, however, merely reactive to delusions.

Suicidal ideas were expressed by 15, 21, 22, and *attempts* were made by 19, 20, and 23.

IV. Anatomical Summary.

As bearing upon the relation of these cases to cases of arteriosclerotic brain disease and of senile atrophy, an analysis of the vascular and cardiac findings in this series is especially important. To this we have added the renal findings.*

Four cases (3, 4, 6, 12) showed extensive *general arteriosclerosis.* There was more or less aortic *sclerosis* in 18 cases out of 23. This sclerosis was marked and associated with calcification or ulceration in four cases (3, 4, 8, 9), moderate in five cases (6, 12, 18, 22, 23), slight in eight cases (1, 2, 5, 10, 15, 16, 17 (thrombus), 21), and presumed on collateral evidence (no note made) in one (11). Aortic sclerosis was absent in five cases (7, 13, 14, 19, 20).

* In the correlation of these we have been aided by Dr. E. T. F. Richards, working at the Danvers Hospital under the Proctor Fund of Harvard University.

Arteriosclerosis elsewhere than in the aorta was noted in 12 cases (2, 3, 4, 6, 7, 10, 11, 12, 13, 15, 16, 21). Of these 12, three cases (10, 15, 21) showed a coronary sclerosis, four showed basal cerebral arteriosclerosis (2, 7, 11, 13), and one (16) showed coronary and cerebral (Sylvian) sclerosis.

Three cases (14, 19, 20) showed no sign of arteriosclerosis, two (7, 13) showed cerebral without general or aortic sclerosis, eight (1, 5, 8, 9, 17, 18, 22, 23) showed aortic without other arteriosclerosis.

Considering next the heart, we find *hypertrophy* of the left ventricle in four cases (2, 3 (also right), 5 (also right), 13). It is to be observed that Case 5 showed only slight aortic sclerosis and Case 13 showed only cerebral arteriosclerosis.

Chronic *interstitial myocarditis* occurred in four cases (4, 10, 14, 23), pronounced brown atrophy in three cases (10, 12, 15).

The *valves* are noted as normal in nine cases (6, 7, 8, 9, 13, 15, 16, 17, 18, 21), showed slight changes, largely mitral, in 11 cases (1, 2, 3 (aortic stiff and calcified), 4, 5, 8, 10, 12, 14 (tricuspid and mitral), 19, 23). The valvular conditions are not noted in three cases (11, 20, 22).

Case 3 showed rupture of heart due to thrombosis of coronary artery; Case 4 showed multiple cardiac infarctions; Case 17 showed a right auricle thrombus; and Case 22 showed marked hydropericardium.

The *kidneys* showed *chronic lesions* in 21 out of 23 cases (*i. e.*, except in 5 and 23). But these lesions were slight in 10 cases (1, 2, 3, 8, 9, 17, 19, 20, 21, 22), leaving 11 cases with anatomically marked lesions, (Case 11 is deficient in notes, but is presumed from other evidence to have shown marked lesions). Of these 11, 4 cases showed lesions of the chronic interstitial type (Cases 6, 13, 14, 16), and eight cases showed lesions of the chronic diffuse type (Cases 4, 7, 10, 12, 15, 18), and one case (11) was undetermined.

It is noteworthy that the cases of marked general arteriosclerosis are not those which showed cardiac hypertrophy (except Case 3) but that three of the general arteriosclerotic cases (4, 6, 12) showed well-marked renal lesions.

The brains in order of weight are:

Male.		Female.	
Case No.	Weight.	Case No.	Weight.
19	1240	22	1040
1	1250	4	1110
13	1310	14	1110
23	1310	6	1130
8	1350	12	1135
15	1370	7	1180
21	1410	16	1220
2	1430	10	1300
		18	1330
		3	1365

The weights in 5, 9, 11, 17, 20 are not recorded; there is reason to believe that Cases 5, 11 were atrophic and that Cases 9, 17, 20 weighed within normal limits (see microscopic notes under casuistic summary).

V. Casuistic Summary.

The main clinical and anatomical features, together with histopathological notes, concerning each case have been gathered for convenience in this section. The details of the microscopic examination have been largely omitted.

Emphasis has been laid chiefly on the distribution of pigmented substances in (1) the cells of the perivascular spaces, (2) the neuroglia cells (including satellite cells), and (3) the nerve cells. The pigment referred to is, as a rule, not the yellow pigment occurring as unilocular masses in senile nerve cells, but a more diffuse brownish granular or irregular pigment which when it occurs in nerve cells, is of more general distribution in the cell body. Six or more blocks, representing three or more areas (usually superior frontal, precentral, and occipital) in each hemisphere, were examined in Heidenhain iron-hematoxylin or Marchi preparations along with Nissl sections from the same regions.

Case 1, male, alcoholic, at 57 failed in business, became amnesic, fabricating, disoriented, with sluggish pupils and diminished knee jerks, and died at 63 from ulcerative colitis. Slight aortic sclerosis. Valvular endocarditis. Brain weight, 1250 grams. Considerable subpial gliosis. Moderate perivascular cell pigmentation throughout. Neuroglia cell pigmentation everywhere considerable, but extreme in precentral and calcarine regions. Satellite cell pigmentation in the layer of medium-sized pyramids and in

lower layers of frontal region; characteristically about the Betz cells, but also elsewhere in the cell layers of the precentral gyrus. It is noteworthy that in many instances, though not constantly, the satellite cells are deeply pigmented and at the same time lie adjacent to non-pigmented cells or to cells containing senile yellow pigment masses which fail to stain by the iron-hematoxylin method. The nerve cell pigmentation differs in the three areas. The major pigmentation in the frontal region is found in the layer of medium-sized pyramids and in the layer of large external pyramids; in the latter layer are some instances of what is possibly true pigmentary degeneration (a process, somewhat rare, leading to cell destruction). In the precentral gyrus the Betz cells show intense pigmentation by the iron-hematoxylin method; among these are some instances in which senile yellow pigmentation occurs. In the calcarine cortex it is surprising to find, in view of the marked Betz cell pigmentation of the precentral gyrus, that the solitary cells of Meynert are comparatively free from such pigment. The frontal cortex in this case shows some numerical loss in the layer of small pyramids.

Case 2, male, alcoholic, at 63 began to have attacks of hallucinatory delirium, "shock" (?) two months before death, peripheral arteriosclerosis, speech thick, amnesia for recent events, vague persecutory delusions, emotionally unstable. Coma one week before death. Death from hypostatic pneumonia. Chronic diffuse nephritis. Slight aortic sclerosis. Marked basal cerebral arteriosclerosis. Cardiac hypertrophy. The lower layers of the cortical areas examined show considerable neuroglia cell pigmentation, and the external pyramidal cells are maximally affected by pigmentation. But there is little sign of lesion in the outer cortical layers, except a slight subpial gliosis in the frontal region (there was a slight milkiness of the overlying pia mater grossly observed). Perivascular cell pigmentation moderate.

Case 3, female, developed persecutory delusions of a religious and sexual cast at 56-8, at 66 developed weakness, numbness and tingling in right arm, difficulty in writing, and thickness of speech, recovered from this attack with slight dementia, and died from rupture of the heart at 68. This case showed the most pronounced general arteriosclerosis in the whole series. There is great probability, however, that this was developed, at least in great measure, after the development of the mental disease. Attention may be called to the curious localized sclerosis at the junction of the left precentral gyrus with induration of the underlying white matter: it is probable that this is related with the right arm symptoms just noted (cf., however, also pontine cyst).

Interpretation of microscopic findings is difficult on account of the complicating arteriosclerosis; but inspection of areas, remote from cysts of softening, shows a moderate nerve cell pigmentation and considerable neuroglia and perivascular cell pigmentation of quite general distribution.

Case 4, female, peculiar after 50, slowly developed sexual persecutory delusions, had auditory hallucinations which disappeared after 63, gave less evidence of delusions in later years and showed some katatoniform signs. Death at 72 from multiple infarctions of the heart. General arteriosclerosis was well marked. There were numerous areas of cortical sclerosis as well as cysts of softening in corpora striata and right optic thalamus. In connection with the katatoniform movements, attention may be drawn to a diffuse cerebellar atrophy with marginal sclerosis. The microscopic examination showed, in addition to arteriosclerotic changes, neuroglia and nerve cell pigmentation of a non-characteristic distribution, with moderate perivascular cell pigmentation.

Case 5, female, had a somewhat questionable convulsive seizure at 66, developed gradually at 67 persecutory delusions of sexual and religious character with auditory hallucinations, in hospital showed weeks of exhilaration followed by weeks of depression, showed at no time either amnesia or disorientation, and died at 72 of hypostatic pneumonia, fatty heart, liver, and kidneys, and multiple abdominal tumors. The brain showed atrophy, notably in the frontal and parietal regions. The microscopic examination showed far fewer changes than the gross observations would suggest. The loss of cells was quite diffuse. The Betz cells contained some unilateral or occasionally more extensive deposits of pigment. The frontal and calcarine areas contain little or no nerve cell pigmentation (Heidenhain). The general neuroglia cell pigmentation was prominent, particularly in the calcarine region. Perivascular cell pigmentation slight. It is impossible to say what relation was borne by the slight cerebral atrophy to the paranoic and hallucinatory conditions of this case. The brain weighed 1340 grams and therefore belongs in the overweight series rather than in the underweight series.

Case 6, female, became eccentric about 60, developed persecutory religious delusions, at 70 showed a moderate peripheral arteriosclerosis, showed at two intervals a few katatoniform symptoms (possibly in reaction to delusory fear), developed some delusions concerning viscera, preserved memory and orientation till death at 77 from pulmonary tuberculosis. The cerebral pigmentation in this case (one of the later ones to be examined) was noted in the gross and proved to be the chief feature of the microscopic examination. Brain weight, 1130 grams. Perivascular cell pigmentation moderate throughout. Neuroglia cell pigmentation well marked and general. Practically all the nerve cells are pigmented in the frontal areas, where the layer of external pyramids shows unusually prominent deposits. The nerve cell pigmentation in the postcentral gyri (precentral not accessible) and in the calcarine area is moderate only.

Case 7, female, had inflammatory rheumatism at 55, lay in almshouse by reason of contractures, developed delusions of a persecutory character 65-

70, had auditory hallucinations, preserved orientation, memory, school knowledge, and interest in surroundings till death at 75 from bronchopneumonia and chronic diffuse nephritis. The brain showed basal cerebral arteriosclerosis, was underweight (1180 grams), and showed chronic leptomeningitis. The pigmentation of the perivascular cells was in all regions moderate, there was a moderate pigmentation of neuroglia cells in the white matter. The nerve cell pigmentation was both of the yellow saccular kind and of the diffuse brown kind, and was more marked in the motor areas. We deal in this case once more with a comparatively simple cerebral atrophy.

Case 8, male, alcoholic laborer, luetic (?) at 52, died about a month after the development of weakness, disorientation, amnesia, visual and auditory hallucinations. Ten days before death rectal temperature 91.4; within 24 hours, temperature gradually rose to 101.8. Death in stupor. Ecchymoses of stomach. Chronic diffuse nephritis. Moderate arteriosclerosis. Brain weight, 1350 grams. The nerve cells are free from diffuse pigmentation, although the Betz cells show yellow saccular pigment. The nerve cells of the frontal region are free from pigment. There is a moderate general neuroglia cell pigmentation and a moderate perivascular cell pigmentation. The interpretation of this case remains, so far as we can discover, quite obscure. An alcoholic element is possible.

Case 9, male, developed delirium and inflammatory rheumatism following otitis media at 50, at 54 gave up work, failed physically, showed arteriosclerosis, had an attack of unconsciousness lasting two hours, two weeks before admission to the hospital, in hospital showed amnesia with fabrications, auditory hallucinations, restlessness, and weakness, and died at 56 of hypostatic pneumonia and fatty heart. Arteriosclerosis was confined to the aorta. The brain weight was not recorded but was probably within normal limits. The microscopic examination showed a considerable general neuroglia cell pigmentation; but the nerve cells are as a rule free from either diffuse brownish pigment or yellow saccular pigment. The satellite cells are as a rule free from pigment. Perivascular cell pigmentation everywhere moderate.

Case 10, female, 55, had shown effects of cardiorenal disease for six months, in hospital showed disorientation, amnesia, visual and auditory hallucinations, feebleness and restlessness, and died 12 days after admission from the effects of her somatic disease. Brain weight 1300 grams. The microscopic examination showed a subpial gliosis of the frontal region, a general perivascular cell and neuroglia cell pigmentation, and in all regions examined a tendency for the cells in the external pyramidal layer to show considerable diffuse brownish pigment. The satellite cells also showed similar pigmentation. The Betz cells of the precentral gyrus were less markedly pigmented than the external pyramids.

Case 11, male, had inflammatory rheumatism in early life, gave up work 66-67, from 67 to 70 had two short delirious episodes, entered the hospital with pronounced cardiorenal signs, disoriented, amnesic for recent events, and died at 70. The brain showed focal basilar and unilateral Sylvian arteriosclerosis, with a cyst of softening external to tip of posterior cornu of right lateral ventricle. There was a dense subpial gliosis. There was a moderate and somewhat variable neuroglia cell pigmentation throughout the regions examined. The accumulation of pigment in perivascular cells is everywhere moderate. A remarkable feature of this case is the almost total absence of nerve cell pigmentation in all the areas examined.

Case 12, female, from 52 had attacks of exhilaration and depression of irregular duration, at 68 showed arteriosclerosis and malnutrition, and died at 69, maintaining memory and orientation almost to the last. There was a terminal exhaustion period of gradual onset of several months' duration. Death from hypostatic pneumonia, pleurisy, pericarditis, and mediastinitis. General arteriosclerosis was marked. Chronic diffuse nephritis. General encephalomalacia and myelomalacia (of terminal infective or toxic origin?). The brain weighed 1135 grams. There was a frontal (including orbital) and central convolutional-sclerosis. Corresponding therewith subpial gliosis was considerable. Perivascular cell pigmentation is nowhere extreme and is as a rule slight. Neuroglia cell pigmentation, practically absent in white matter and in subpial zone, is prominent in the nerve cell layers and especially in the substellate region. The neuroglia cell pigmentation is shown in its extremest form in the calcarine region. Satellite cell pigmentation is nowhere marked. The nerve cells rarely show more than a unilateral collection of small granules or a few peripheral granules. No distinction between large and small cells can be remarked with respect to this dark pigment.

Case 13, male, developed at 63 an unreasonable attitude to his family, with flight of ideas and violent tendencies, and, on transfer to insane hospitals maintained his abusive and annoying conduct, elation, and psychomotor activity for four years. Death from multiple injuries at 67. The brain showed chronic pial changes, notably along vessels, a basal cerebral arteriosclerosis of moderate degree, atrophy of the frontal cortex, and a focal area of softening of one paracentral lobule. The microscopic examination showed neuroglia cell pigmentation in the white matter and in the subpial region, but to a great degree absent from the nerve cell layers (frontal). There was a moderate degree of perivascular cell pigmentation throughout. The nerve cells were in almost all instances quite free from any type of pigment. In a few nerve cells occurred a small collection of pigment granules on one side of the cell. The distribution of the neuroglia cell pigmentation (in the subpial region and white matter) seems to indicate its origin in myelin decay. The occipital cortex, though it showed no gross atrophy, showed a slight degree of microscopically observable subpial pig-

mentation. The white matter of the occipital region was largely free from pigment. The precentral gyri form an exception to the general rule of pigment absent in nerve cells, since occasional large cells (Betz and external pyramids) show considerable pigmentation.

Case 14, female, became maniacal at 57 and remained so till death at 70 of generalized tuberculosis. The brain weighed 1110 grams and showed a subpial gliosis, well marked in frontal and extreme in central regions. The white matter and the subpial region showed a moderate neuroglia cell pigmentation in all regions examined. Perivascular cell pigmentation was moderate throughout. Conditions varied with respect to nerve cell pigmentation; the external pyramids of the frontal region, the Betz cells of the precentral gyri, and the solitary cells of Meynert in the calcarine region contained much diffuse brownish pigment. A remarkable feature of the frontal sections was that, although the internal pyramids showed far less pigmentation than the external pyramids, the neuroglia cells of the internal pyramidal layer were much more highly pigmented than the neuroglia cells of the external pyramid layer. Yellow pigment was also very prominent in the precentral large cells. The smaller nerve cells nowhere showed much pigmentation. The interpretation of these microscopic findings is difficult and doubtless impossible with the data at hand.

Case 15, male, became hypochondriacal at 56, later restless and suicidal, was committed, maintained memory and orientation, and developed feelings of unreality and nihilistic ideas. Death at 58 from chronic diffuse nephritis. Brain weight, 1370 grams. The microscopic examination failed to show nerve cell pigmentation, but showed a slight satellite cell pigmentation in the frontal region. Some of the large cells of the precentral gyri showed pigmentation, and there was both satellite cell and general neuroglia cell pigmentation in this region. Elsewhere a moderate general neuroglia cell pigmentation and perivascular cell pigmentation.

Case 16, female, became depressed at 65 after nursing husband, showed arteriosclerosis and albuminuria, developed increasing defect of attention and amnesia for recent events, auditory hallucinations, and feelings of unreality, agitation, and insomnia. Death from infection following accidental wounds six months after commitment. Brain weight, 1220 grams. A single patch of sclerosis was found in the right Sylvian artery. The microscopical examination showed very little perivascular cell pigmentation. The neuroglia cell pigmentation is moderate and begins to be prominent only in the layer of external pyramids. Nerve cell pigmentation, slight in frontal and calcarine areas, is more extensive in the motor area. The external pyramids of the frontal and the Betz cells show more pigment than other nerve cells, and the brownish pigment is combined with yellow pigment in these cells.

Case 17, male, had had delirium in grippe and typhoid fever at 61, became depressed, sleepless, and thin at 65, developed feelings of unreality and nihilistic delusions and died within six months of onset with cystitis, retroperitoneal suppuration, thrombosis of right auricle and of aorta, and pulmonary embolism. The microscopic findings yielded a suspicion of paralytic dementia from the occurrence of a moderate lymphocyte and plasma-cell exudate in the meninges (normal in the gross); but the absence of notable alterations in the nerve cell layers seems to exclude this suspicion. Perhaps the extensive suppurative process in the trunk may be related with the meningeal exudate. The large nerve cells failed to show brown pigmentation (notably the Betz cells and the solitary cells of Meynert), but the smaller nerve cells (such as those of the outer cell layers) showed well-marked brown pigmentation. The neuroglia cell pigmentation and that of the perivascular cells presented nothing characteristic, being moderate and of general distribution.

Case 18, female, developed at 58 insomnia, hallucinations, persecutory delusions and financial worry, showed peripheral arteriosclerosis, albuminuria, exaggerated reflexes, remained apprehensive, imperfectly oriented, and tardy in answering questions, and became increasingly depressed and restless, dying, two months after onset, of enteritis. There was thrombosis of a branch of the right Sylvian artery. Brain weight, 1330 grams. Microscopic examination showed slight perivascular cell pigmentation, considerable neuroglia cell pigmentation in the nerve cell layers, and extreme nerve cell pigmentation rather more characteristically in the substellate layers but sparing neither large nor small cells. (The calcarine region was not accessible in Heidenhain preparations.) Satellite cell pigmentation was variable in degree: near some cells maximal, but in general not much in evidence.

Case 19, male, alcoholic in early years, at 70 grew depressed, threatened, and finally attempted suicide. He was anemic and showed peripheral arteriosclerosis, somewhat retarded in responses, slightly amnesic, deluded concerning family, and constantly depressed. Death after gradual physical failure from acute pleurisy developing upon chronic pulmonary tuberculosis with apical abscesses. There was basal cerebral arteriosclerosis, focal atrophy of one opercular region and chronic internal hydrocephalus. Brain weight, 1240 grams. Microscopically, gliosis of the outer layer was marked. Perivascular cell pigmentation was moderate or slight. Neuroglia cell pigmentation was everywhere marked. And, although the nerve cells nowhere contain much brown pigment, the satellite cells in many places show much brown pigment. The large nerve cells of the frontal and precentral gyri contain much yellow saccular pigment.

Case 20, male, attempted suicide at 52 after financial worry, shortly improved, but grew depressed once more, developed auditory hallucinations,

and was committed in a feeble, apprehensive, retarded, partially oriented state. Frightful auditory hallucinations. Self-accusations. Restless agitation. Death three months after onset, from aspiration pneumonia. There were no gross lesions in the brain. Microscopically, perivascular and neuroglia cell pigmentation were slight or moderate throughout. The subpial region of the frontal gyri contains neuroglia cells enclosing very large pigment granules. Nerve cell pigmentation moderate, though some of the large cells of the calcarine region have considerable brown pigment. There are small local accumulations of brown pigment granules in some cells. The large nerve cells of the precentral gyri contain little pigment.

Case 21, male, after two years financial trouble, grew depressed and self-accusatory and expressed fear of injuring family or himself, on admission six months later, showed tuberculosis of lungs, unequal knee jerks, depression, slow motions, auditory hallucinations. Memory and orientation were maintained until death at 54, from bilateral advanced pulmonary tuberculosis. Brain weight, 1410 grams. One olfactory tract absent. Microscopically, considerable perivascular and general neuroglia cell pigmentation. The nerve cells, especially those of the external pyramidal layer, were loaded with brown pigment.

Case 22, female, developed at 55 restlessness, self-depreciation, suicidal ideas, showed arteriosclerosis and albuminuria, on commitment, and then developed a depressed inactive state with distressing visual hallucinations at night, became retarded, but preserved orientation and fairly good memory until death at 59. Acute purulent pericarditis. Atrophy of liver (simple), 760 grams. Renal atrophy. Brain weight 1040 grams. Microscopically, perivascular cell pigmentation slight, neuroglia cell pigmentation slight except in the frontal subpial region where it is moderate and in the calcarine region where it is marked. The nerve cells are characteristically free from pigment. The Betz cells are likely to show a few pigment granules round the periphery and occasionally show extreme pigmentation.

Case 23, male, alcoholic in early years, 10 years temperate, became depressed and attempted suicide at 64, recovered in a few months, worked at the hospital as machinist and died at 72 of tuberculous peritonitis. The brain showed slight chronic fibrous leptomeningitis weight 1310 grams. Microscopically, there was slight perivascular cell pigmentation. The neuroglia cell pigmentation is general and intense. The nerve cells tend to show granules in all parts of the cell body. The larger cells tend to show relatively less pigment.

VI. (A) Correlations with Arteriosclerosis.

Arteriosclerosis was clinically recognizable in 10 cases and was found anatomically in 20 cases. There was marked general

arteriosclerosis in four cases, aortic sclerosis in 18, sclerosis elsewhere than in the aorta in 12. Nine cases showed cerebral arteriosclerosis.

Heart disease was clinically recognized in nine cases, anatomically in 12 cases.

Kidney disease was clinically recognized in nine cases, anatomically in some degree in 21 cases, but markedly in 11 cases.

The cases of marked general arteriosclerosis are not those which show cardiac hypertrophy (except in Case 3), whereas three of the marked arteriosclerotics (not including Case 3) show well-marked kidney lesions.

It does not appear from a review of the histories in the four well-marked arteriosclerotics that arteriosclerosis had necessarily anything to do with the insanities. The durations of insanity in these cases were 10-12, 22, 17, and 17 years, respectively, and their ages at death were 68, 72, 77, and 69, respectively. These cases have with one exception (Case 14, 13 years) the longest durations in the series.

The onset was gradual in 16 cases, sudden in seven cases.

There were but seven cases with peripheral motor or sensory disorder; these disorders were largely trivial in character. Knee jerks were absent in one case, unequal in two.

Evidences of focal brain lesion were clinically found in four cases, one 8-10 years after onset, one a doubtful "shock" two months before death, one a single convulsive seizure six years before death, one a period of two hours' unconsciousness 23 days before death.

Anatomically, only one of these four showed focal lesions (Case 3), but four others (Cases 4, 11, 13, 18) showed focal lesions unsuspected during life.

Of the four well-marked arteriosclerotic cases, three were paranoic and one maniacal. Of the five cases with cysts of softening in various regions, two were paranoic, and one each delirious, maniacal, and depressive cases.

There seems to be no good ground for asserting that arteriosclerosis runs parallel with these insanities or has much more than a complicating relation to them. It remains, of course, possible that arteriosclerosis may, sometimes and under certain con-

ditions, bring about the structural and functional necessities for the development of insanity; but this point will be exceedingly difficult to prove.

(B) Correlations with Senile Atrophy.

Do these cases stand in a closer relation to senile atrophic processes than to the arteriosclerotic processes just considered?

The weights of 18 brains in this series are recorded; and atrophic processes in the others can be decided safely from notes or microscopic description. Seven (probably eight) of the female brains weighed less than 1235 grams, three weighed over 1235 grams, five (probably six) of the male brains weighed less than 1358 grams, three weighed over 1358 and three were not recorded but probably weighed within normal limits.

The seven (probably eight) underweight female brains all weighed less than the lightest male brain. The lightest brain (Case 22, 1040 grams, representing a diminution of about 15 per cent from the average weight) occurred in a case with liver weighing but 760 grams and with very small kidneys. The duration of mental disease in this case was four years. The durations in the remaining underweight female brains were (four, 1110 grams, 22 years; 14, 1110 grams, 13 years; six, 1130 grams, 17 years; 12, 1135 grams, 17 years; seven, 1180 grams, 5-10 years; 16, 1220 grams, six months; five regarded as atrophic, six years). Such durations indicate the possibility that the atrophy supervened upon the mental disease in several instances; but the conditions in Case 22 seem remarkable. In the female cases with overweight brains, the data are: 10, 1300 grams, five months, æt. 55; 18, 1330 grams, two months, æt. 58; three, 1365 grams, 10-12 years, æt. 68.

In the case of the male brains, the deviations are not so great, and the durations are far briefer (19, 1240 grams, one year; one, 1250 grams, six years; 13, 1310 grams, four years; 23, 1310 grams, mentally capable at death; eight, 1350 grams, brief; 15, 1370 grams, two years; 21, 1410 grams, three years; two, 1430 grams, two years; nine, probably normal weight, six years; 17, probably normal weight, six months; 20, probably normal weight, three months).

It therefore appears that, though there is much more atrophy in these female brains than in the male, the duration of life beyond the onset of mental disease is also far greater in these females. It is therefore, natural to suppose that the atrophy is here a function of longevity rather than one of mental disease.

(c) Distribution of Cortical Pigments.

Inclined to the conviction that both arteriosclerosis and atrophy are merely complicating features in the insanity of these subsenile decades and that we must look elsewhere for the causes and structural conditions of the insanities here discussed, we examined the tissues with a view to obtaining further light from the microscopic side. Aside from the apparently non-essential degenerations and tissue losses incidental to arteriosclerosis and atrophy, are there any essential alterations, either destructive or non-destructive, involving cells or fibers or the investing neuroglia in these conditions?

We had previously described three cases (one of which, Case 17, is reproduced in this paper) of depression in which the factors of arteriosclerosis and simple atrophy could reasonably be excluded from a causative rôle. In these cases our attention had been especially levelled at certain intracellular pigmented substances. These substances, demonstrable in several ways, were particularly well brought out in Heidenhain iron-hematoxylin preparations after alcohol fixation.

The interesting feature of the former study was that these pigmented substances were accumulated largely in the bodies of the smaller nerve cells in various cortical regions, perhaps more particularly in the suprastellate nerve cell layers. The large cells, such as the Betz cells of the precentral gyrus and the solitary cells of Meynert in the calcarine region, were free from these substances.

The confinement of these deposits to the smaller cells and their absence from the large (projection) cells suggested an attractive line of attack on the histology of the cortex in mental and other disease. We have, therefore, paid especial attention to these intracellular deposits in the present series of cases. The deposits of pigmented substances which can be brought out by the Heiden-

hain iron-hematoxylin method are found in (1) cells of a phagocytic character lying in the adventitiæ of vessels, (2) neuroglia cells, (3) nerve cells.

Our results in this field are so far wholly qualitative and are based upon estimates of the iron-hematoxylin staining substances in comparatively few areas from each case, as a rule frontal, precentral, calcarine. So far as our results go, however, they are of some interest.

Perivascular cell pigmentation was a constant feature in all 23 cases. We interpret this to mean merely that certain products of tissue metabolism are not being discharged completely from the tissues. And it is our general experience, in accord with that of others, that pigmented material is perhaps constantly found in the perivascular regions of the brains of persons of middle age. It is not an infrequent feature in brains of persons, regarded as normal, in the fifth decade. It is a remarkable feature of our results at this stage that the perivascular cell pigmentation is of fairly even degree in all the areas examined from any one case and that, consequently, the perivascular deposits do not afford an index of the varying metabolism of different areas of the cortex. It is possible, however, that investigation of further cases will reverse this conclusion.

Not every case in our series showed the same degree of perivascular cell pigmentation. Both the male case with lightest brain (19) and the female case with lightest brain (22) showed slight perivascular deposits. The tissues showing least perivascular deposits were from Case 16, female, æt. 65, an agitated sleepless melancholic, with brain weight 1220 grams.

There are more significant variations in the *neuroglia cell pigmentation,* which like the perivascular deposit was shown in every case. Whereas the perivascular deposits seemed to occur in similar amounts in all areas of a given cortex, the neuroglia cell deposits in several cases varied in degree from area to area: in particular, three cases (1, 5, 22) showed more extensive deposits in the calcarine and occipital neuroglia cells, and Case 1 also showed extensive deposits in the precentral area. The significance of such variations is not apparent.

Intragyral variations in the degree of neuroglia cell pigmenta-

tion were noted in seven cases. In only one of these (Case 11) were the variations of an irregular and apparently capricious character. In Case 13 the frontal cortex showed little or no neuroglia cell pigmentation in the nerve cell layers, but considerable in the subpial zone and in the white matter: this may probably show that the neuroglia cell pigmentation is an index of myelin decay in some instances. Opposite conditions held in Cases 12 and 18, where the neuroglia cell pigmentation was more or less sharply confined to the nerve cell layers. Still more differential conditions were found in Case 14, where the neuroglia cells of the layer of internal pyramids were more highly pigmented than those of the layer of large external pyramids, and in Case 16, where the neuroglia cell pigmentation began to be marked only in the layer of large external pyramids and in lower layers.

The most marked neuroglia cell pigmentation occurred in Cases 19 (a depressed case, æt. 70, formerly alcoholic) and 23 (a depressed case formerly alcoholic, for seven to eight years without active mental disease, dead at 72). The least extensive deposits in neuroglia cells occurred in Case 20 (a depressed case, not alcoholic, dead at 52, after three months' symptoms). The factors of age and alcoholism may possibly therefore influence these deposits in the bodies of the neuroglia cells.

More striking variations are shown by the amounts and distribution of iron-hematoxylin-staining *pigment in the nerve cells.* Although it is probable that no brain was absolutely free from traces of such pigmentation, yet four cases (eight æt. 55, nine æt. 56, 11 æt. 70, 19 æt. 71) showed extremely little pigment in the nerve cells. Of these, eight showed the "senile" yellow pigment in the Betz cells and 19 showed yellow pigment in the larger nerve cells of both frontal and precentral gyri. Case 19 was also remarkable in that the satellite cells were often highly pigmented whereas their adjacent nerve cells were pigment-free. The almost total absence of pigment in 11 is surprising in the presence of focal arteriosclerotic lesions and atrophy.

Cases 5 æt. 72, 12 æt. 69, 13 æt. 67, 15 æt. 58, 22 æt. 59, form a group in which a slight but noteworthy amount of nerve cell pigmentation occurred. In 13, 15, and 22, the precentral area showed considerable pigment whereas other areas were compara-

tively free. It is a curious coincidence that all three of these cases showed conduct disorder (13 destructive and violent, 15 and 22 suicidal).

More marked pigmentation with some stratigraphic variation is shown by a group of 11 cases (1, 2, 6, 7, 10, 14, 16, 17, 18, 20, 23). The suprastellate layer of pyramids seems to be marked for special pigmentation (Cases 2, six (frontal), 10, 14 (frontal), 16 (frontal)). Of these cases, five (2, 6, 10, 17, 23) belong in the class (described in our former paper on melancholia), of cases in which the large (projection) cells are relatively pigment-free, whereas the smaller cells are pigmented. Cases 20 and 22 show the opposite relations. Case 1 showed pigment in the Betz cells but the homologous solitary cells of Meynert were pigment-free.

VII. Conclusions.

Arteriosclerosis and *senility,* separately or combined, have been very handy terms in psychiatrical diagnosis. However, we believe we have proved conclusively, by the present analysis, that neither old age changes nor arterial disease have any necessary connection with the development of insanity in the later years of life, at least in the sixth and seventh decades. It seems probable that *arteriosclerosis, senility,* and various forms of *insanity* are entities which frequently interpenetrate, but are logically and genetically quite separate. Even the degree to which old age and arterial disease serve as *complicating factors* in insanity has been much overestimated.

The constructive part of our paper looks in the direction of the distribution of intracellular pigments, a species of work harking back to the somewhat neglected field of Bevan Lewis (1890). The perivascular cell pigments, according to our comparisons, seem to afford some index of the degree of faulty metabolism of the cerebral tissue: these pigments are deposited in like amounts throughout a given brain. The neuroglia cell pigments, in the light of the present material, vary rather with the age of the individual. The nerve cell accumulations are subject to the greatest variations even in a single brain, certainly do not vary with the age of the individual, and vary according to some undetermined principle.

We have omitted literary references in the present paper, but wish to express our gratitude to Prof. A. M. Barrett for the use of some of his Danvers Hospital material. Our work may be regarded as in some sense a complement to Barrett's Study of Mental Diseases Associated with Cerebral Arteriosclerosis (*Am. Jour. Insanity*, LXXII, 1, 1905). Our cases are from the same general source as Barrett's cases, but are in no instance identical therewith.

It would be of some value to fuse with the present analysis a similar analysis of the frankly organic cases of the same epoch, in order to pick out, if possible, the special constituents of the mental picture produced by the gross lesions. This task we have in hand.

Our results briefly are:

1. Twenty-three cases of insanity, presumed to arise in the sixth and seventh decades, have been studied clinically and anatomically. Two of these were alcoholic in origin. Five were paranoic. Four were cases of delirium. Three were maniacal. Nine were cases of depression.

2. Two of the paranoic cases developed katatoniform symptoms and might be placed in the dementia præcox group.

Seven cases are possibly classifiable in the manic-depressive group. Two of these had attacks of retardation. One case remained maniacal for 13 years. One case recovered from a single suicidal depression and died eight years later of intercurrent disease.

3. Neither general nor cerebral arteriosclerosis bears an essential causative relation to the insanities developed in the sixth and seventh decades by the 23 cases clinically and anatomically studied.

4. The insanities arising in these decades are not characteristically due to the premature onset of senile atrophy. Eight out of 11 female brains were atrophic: the average age at death was 69.8; the average duration 10.8 years. Five out of 12 male brains were atrophic: the average age at death was 65.6; the average duration 2.7 years.

Either the female cases are more liable to brain atrophy and to live longer with atrophied brains or else the atrophy is merely

a function of their greater age at death. The average age at death in all 11 females is 67.2; the average duration 8.8. The average age at death in all 12 males is 62.3; the average duration 2.8. The differences in age at onset: female average 58.4 (atrophics, 59.8), male average 59.5 (atrophics, 62.9), are not great.

5. A comparative study of the distribution and extent in several cortical areas of certain pigmented materials demonstrable by iron-hematoxylin (among other methods) brings out extreme and interesting variations in the cases examined.

Perivascular cell pigmentation is almost uniform in different areas of the same case, bar focal destructive lesions, but varies in degree in different cases.

Neuroglia cell pigmentation, when of general distribution, probably varies more or less directly with age.

Nerve cell pigmentation (iron-hematoxylin) is not a function of age. It is premature to relate the amounts and distributions of nerve cell pigments with different mental diseases.

THE PROPER SIZE OF HOSPITALS FOR THE INSANE.

By CHARLES W. PILGRIM, M. D.,
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The question as to the proper size of a hospital for the insane, for the attainment of the best results in care and treatment, is one which has long been discussed.

On June 18, 1850, a committee of the Association of Medical Superintendents of American Institutions for the Insane was appointed and instructed to report at the meeting in 1851 a series of propositions relative to the structure and arrangements of institutions for the insane which would express the well-ascertained views of that body in reference to points upon which there was unanimity of opinion. Twenty-six propositions were reported, upon which all were agreed, and many of them are as pertinent to-day as they were nearly sixty years ago. I will not detain you with all of these propositions, although they are well worth reading, but will refer only to No. V, which says: "The highest number that can with propriety be treated in one institution is 250, while 200 is a preferable maximum," and No. VII, which says: "Every hospital having provision for 200 or more patients, should have at least eight distinct wards for each sex."

For more than 15 years these propositions remained unchanged and during that time the small institution with its small wards, and preponderance of single rooms, remained the standard for asylum construction in this country. In 1866, owing to the difficulty of providing for the increasing number of insane, and after an acrimonious debate by members of the Association in regard to the care of the chronic insane in separate institutions, which was caused by the passage of the act authorizing the establishment of the Willard Asylum, Dr. Nichols offered the following resolution: "The enlargement of an institution for the insane, which, in the extent and character of the district in which it is situated, is conveniently accessible to all the people of such district, may be properly carried to the extent of accommodating 600

patients, embracing the usual proportions of curable and incurable insane in a particular community."

This resolution did not stop the building of the Willard Asylum but it did for more than two decades limit, to 600 beds, the size of all institutions which were supposed to treat and cure the insane. There was no great increase in the size of any of the existing institutions in the State of New York, with the exception of Willard, which was established for the care of the chronic insane only, and the asylums controlled by the counties of New York and Kings, which cared for the insane of the Metropolitan district, until the passage of the State Care Act in 1889. With the passage of that act, however, the demand for immediate State provision for those who were being cared for in the county-houses became so urgent that there seemed nothing left but to enlarge as speedily as possible the existing institutions, which soon became the vast "caravansaries," as they have been aptly called, from which we now suffer. America, in its hospitals for the insane, as in everything else, took readily to the idea of "bigness" and many of our hospitals exceed in size anything to be found in any other country of the world. Owing to the lesser cost of this style of construction, on account of the large wards and dormitories and associated dining rooms, this type of building rapidly gained favor, in the eyes of those who considered only the initial cost; but a reaction came as soon as experience demonstrated the disadvantages of this plan and to-day the majority of thoughful and experienced alienists believe that neither the interests of the State nor those of the patient are best served by the present methods of herding the insane in vast wards and dormitories with from 50 to 150 patients in each. In England, where huge institutions at first found great favor, a reaction has also come. Dr. Richard Greene, late superintendent of the Berry Wood Asylum, Northampton, in a thoughtful paper on "The Insane, the Asylum and the Nurse," says: "I need hardly point out that the mere size of an asylum has much to do with the amount of the maintenance-rate, and it would seem that the very large and the very small are the highest. Putting aside the very small ones and dividing the rest into two classes, one between 600 and 1200 beds and the other from 1200 to the highest limit yet attained, say 2400, we

should find that in the first section the average maintenance-rate was 8 s. 4½ d. and in the other section it was 9 s. 2 d. a week. As there are 33,000 in the latter section, a simple calculation will show that there is a wholly unnecessary loss to the nation of £95,000 a year. I have emphasized the money side of the question, but waste of money is not the only objection to these gigantic asylums, and if any of my audience here to-night possess influence with the Home Secretary, I hope they will entreat him not to sanction the erection or extension of any asylum beyond 1000 beds or at the utmost 1200."

While an analysis of the maintenance-rates in the various hospitals of New York State does not support Dr. Greene's contention altogether, it does lead to some very interesting conclusions. I have carefully examined the figures relating to the net per capita cost of support in the different institutions for the fiscal year ending September 1, 1907, and I find that they make an excellent showing for the smaller hospitals. If we take the four largest hospitals in the State with a total population of 13,699 patients and an average population of 3425 for each institution, we find that the average per capita cost is $170.13 per year, while with four of the small institutions with a total population of 4702 or an average of 1175 for each, we find that the average per capita cost is $169.95 per year. A still better showing is made if we take the lowest net maintenance-rate in any of the smaller hospitals, which is $148.40, and compare it with the lowest net rate in any of the larger hospitals, which is $157.54, for here we find a difference of $9.14 per capita per year in favor of the smaller institution.

These net figures are obtained by deducting from the gross cost of maintenance the amount collected by each hospital for the support of those patients whose friends are able to fully or partially reimburse the State and, therefore, should not be used without qualification, as the location of the hospitals and the social grade of the patients have more to do with this question than numbers. They are presented merely to show the fallacy of using numbers alone and that by one process of reasoning at least the small hospitals support their patients at a lower per capita cost to the State than the large ones.

Now if we take the gross cost of maintenance in the four smaller hospitals, with an average population of 1175, we find that the average cost is $191.35 per year; the three hospitals with a population ranging between 1500 and 2000 have an average rate of $190.88; those with a population ranging between 2000 and 3000, $191.48, while the four largest with an average production of 3425 have an average rate of $178.93. We thus see that a population of about 1500 gives as great economy as it is possible to get until we extend the institution to twice that number.

If we take all the institutions with a population of less than 1500 we get an average yearly per capita cost, as before stated, of $191.35, while if we take all of the institutions with a population of more than 1500 we get a general average of $183.48, a difference in favor of the large institutions of a little less than $8.00 per capita per year. If we try to discover where this difference is we find that the average per capita cost for medical service in the four smaller hospitals is $13.42 while in the four larger hospitals it is only $8.00 per year; the average cost of the ward service in the former is $36.54 while in the latter it is $33.93. We thus find that the two items of medical service and nursing show a difference sufficient to account for the whole saving. And where is there a medical man who is willing to say that all economies should be effected in medical care and nursing unless he is willing to see our institutions lose their hospital character altogether and become vast boarding houses instead of the curative establishments which we should strive to make them?

In New York State where the financial management of the hospitals is practically on a uniform basis, and where, on account of the system provided for the "joint purchase" of supplies, the small hospital is placed on an equal footing with the large one, there would seem to be but little reason for mammoth institutions.

When we analyze the results of treatment we find that the percentage of cures, computed upon the original commitments, was 26.78 per cent in the four smaller hospitals, while 21.26 per cent were discharged as improved, making a total of 48.04 per cent who were restored to home and friends. In the four largest hospitals the percentage of cures was 24.45 per cent, while 20.08 per cent were discharged as improved, making a total of 44.53 per

cent which gives a result of more than 3.50 per cent in favor of the smaller institutions. The deaths were very close, the percentage being 34 per cent in the former and 33.96 per cent in the latter. As it is generally conceded that the recovery of a patient is a saving to the State, no matter at what cost it may be effected, the percentage of cures is a very important fact to consider, for if the smaller hospitals restore to lives of usefulness 3.50 per cent more than the larger ones the amount saved by the latter in the yearly per capita cost does not mean so much after all.

The figures which I have given show beyond doubt that many things besides numbers enter into the highness or lowness of the maintenance-rate and in making any comparison there should be considered in addition to the number cared for, the localities of the hospitals, the character and sex of the patients, the facilities and rates for getting in large commodities, such as coal, flour, beef in car-load lots, etc., the productiveness of the land cultivated by the hospitals, the character of the crops which each can raise, and the availability of the immediate market for the purchase of supplies which the hospital lands do not furnish; and above all else consideration should be given to a comparison of the standard of treatment and care not only of the curable cases but of those who are in the chronic stage. Cases of recovery after one or two years of care and treatment in patients classed as chronic are not at all uncommon, and many others of this class, although not entirely recovered, get into a condition to leave the hospital and are able to lead useful and happy lives among their kinsfolk and friends.

For the acute cases our new psychopathic hospitals will undoubtedly do much, for the demented the large wards answer very well, but for the large class between these two extremes I am sure much more can be done than we are doing under present methods. Such cases, unless they present some unusual and interesting features, become lost in the vast wards to which they are assigned, and often I believe, drift into a hopeless dementia from which individualized treatment might have saved them. The majority of the chronic insane are appreciative of physical comforts and to a certain number of patients the days spent in a large ward and the nights passed in a large dormitory are periods of

distress and trial. And the large dining rooms where several hundred patients of all kinds are assembled thrice daily to participate in what has been called "the tragedy of the diet," must surely be depressing to anyone not wholly insensible to the ordinary habits of life. Dr. Conolly, in speaking of huge institutions, with their lack of privacy, says: "I do not know of one good reason that can be advanced in favor of large dormitories for the clean and orderly. Those who sleep in them are generally discontented and no complaint is so constantly on their lips, as that which arises from their not having a single moment to themselves, or any place where they can be quiet, or where they can even say their prayers without interruption." Dr. Bucknill, in referring to Dr. Conolly's views, as above expressed, says that no one who has had charge of a large asylum will be inclined to meet such sentiments with a sneer. If only a small proportion of such cases can be restored to home and friends the effort is worth making from an economic view, and the dictates of humanity require that we do something more than merely house and feed the large number of appreciative chronic insane, who, before their affliction, were, in the majority of cases, wage earners and contributors to the prosperity of the State.

We are all familiar with the two arguments for large institutions, viz.: 1, cheaper care (no one yet has ever had the courage to say better care), and 2, greater completeness of equipment and better opportunities for classification, with increased facilities for diversion and occupation.

The first argument, I think, has been answered by the figures which I have presented, and I believe that I am right in saying that in the opinion of those best qualified to judge, the maximum of efficiency is certainly reached, and probably the maximum of economy also, in institutions of from 1200 to 1500 beds.

In regard to the second argument, I think we must admit that there is no reason why an institution of 1000 or 1500 beds, if properly planned, should not possess every desirable feature in the way of equipment and offer every advantage in the matter of classification, and, after that number is reached, I believe that the facilities for amusement and occupation are merely duplicated rather than diversified.

In opposition to the doubtful arguments in favor of large institutions there are many in favor of the medium-sized hospitals which cannot be controverted. First, as Bucknill says: "It is not the bricks and mortar which cure patients, but the living spirit, as it were, which animates them." Another writer in speaking of the influence of a superintendent has said: "The institution is the portrait of the man." Now who will maintain that any man weighed down with the official duties connected with the management of an institution for three or four thousand patients, and eight or nine hundred employees, can so impress his individuality and influence upon that number, or keep in sufficiently close touch with both medical and lay matters, as to secure the best results? Those who favor large institutions will undoubtedly answer me by saying that where the organization is efficient the results will be satisfactory, and I must admit that with an ideal organization there would be some force to the argument, but with the difficulty which we all have in getting and keeping good assistants a highly efficient organization is not always possible. It, therefore, seems to me that if our institutions are to be enlarged to the gigantic proportions which some have already attained that greater inducements should be offered, and greater efforts be made, to keep the medical service up to a high degree of efficiency.

But if we do succeed in getting an efficient organization what does it mean except that we have several small institutions within one large one? And what does that mean except that the personal influence of the superintendent is lessened with the growth of the institution until his manifold executive duties make it difficult for him to know either the merits or the faults of his employees, while the management and treatment of the patients must be left entirely in other hands.

As Dr. Hollender, in discussing this question, has aptly said: "The driver may be placed too far from the leaders to make the curb felt, so, as the asylum increases in size, the exercise of authority by its head over his subordinates is proportionately diminished." Under such circumstances the authority of the subordinate officers and attendants is greatly increased and the opportunity for abuse of power, and the exercise of petty tyranny over patients, are much greater than they would be in a smaller institution.

It has been suggested that some of the evils of our extremely large hospitals might be lessened by building the necessary additions some distance from the parent institution and continuing them as branches until they become of sufficient size to warrant their organization as a separate institution. In this way the advantages to be gained by purchasing supplies in large quantities would be obtained, the various localities would be more conveniently provided for, and the difficulty of getting sufficient money to establish a new institution would not be encountered. It would also give the assistants placed in charge of these branches an opportunity to develop into good hospital men. This plan was adopted originally by the New York authorities when the colony at Central Islip was established, and also in Toronto when the branch at Mimico was started.

My second objection to very large institutions is the fact that in order to keep them filled the districts must be so large that the hospital is inaccessible to the friends of a majority of the patients. Great distances from points of commitment are objectionable so far as the transportation of the patient is concerned, and it is certainly a great hardship to the friends of the patient when the journey is long and costly.

My third objection is that these large districts make proper care of patients pending commitment very difficult whereas a greater number of smaller and more accessible institutions would do much to solve that problem.

Another matter in this connection which seems to me to be of great importance is the fact that hospitals for the insane, as a general rule, have the confidence of the physicians and residents in their immediate neighborhood, and that the confidence thus built up and disseminated does much to encourage that for which we are all striving, viz., the early treatment and more frequent cure of the insane. In my opinion in no other way can the "hospital idea" be so well cultivated, and the increase in insanity so well combated, as by the erection of a greater number of smaller institutions instead of increasing to unseemly proportions those already existing.

My fourth objection does not relate to the care of the patient but to the up-keep of the institution. From experience I know that a small hospital can be kept in good repair more easily than

a large one. It is difficult, for instance, to get $10,000 to repair five buildings, whereas $2000 to repair one could be easily obtained. The same argument applies to the furnishings and all other matters relating to equipment and general management.

My own preference would, therefore, be for an institution of not more than 1000 patients, but as weight must be given to the question of economy in management the limit might be raised, without serious disadvantages to the patient, to 1500. All hospitals should be situated, as recommended in the original propositions of 1850, "within two miles of a large town, and should be easily accessible at all seasons." The cottage system should be adopted and the buildings should be divided into the following groups:

First. A central or administration building, with offices, etc.

Second. A residence for the superintendent, a staff house and a nurses' home.

Third. An amusement hall and chapel.

Fourth. Utility buildings such as bakery, laundry, shops and boiler house.

Fifth. Buildings for the use of patients as follows:

1. A reception building to accommodate about	6%
2. A hospital for sick and surgical cases with operating room for about	2%
3. An infirmary for feeble and bed cases for about	18%
4. A building for tubercular cases for about	4%
5. A building for epileptics for about	4%
6. Buildings for the disturbed, restless and noisy for about	20%
7. Buildings for workers, laundry, shops, farm, grounds, etc., for about	22%
8. Buildings for the chronic quiet and clean for about	22%
9. A building, situated some distance from the others, for convalescents for about	2%
	100%

The proportion of single rooms to dormitory space should be about 25 per cent.

With such a plant an experienced superintendent could keep in touch with everything, and, with a proper organization, would be able to administer the affairs of the hospital in a way to bring credit to himself, satisfaction to the State authorities, and, above all, health to the curable patients, and some degree of happiness and content to those beyond the hope of cure.

A VISIT TO THE PSYCHIATRIC CLINICS AND ASYLUMS OF THE OLD LAND.

By EDWARD RYAN, M. D., Kingston, Ont.

Any opportunity of adding to our store of knowledge is welcome indeed, and especially so if it takes the form of a long looked-for break in the round of arduous professional life. But when it takes us away to the old land, and brings us in contact with an older civilization, in close touch with other ideas of life, and within the portals of educational institutions time-honored and revered, then truly it is an event in one's life, of more than ordinary importance.

In Ontario, more particularly for the past few years, educational affairs have been much in the public mind. In this connection the administration of hospitals, especially in university centers, would naturally claim attention. The wisdom or want of wisdom exhibited in the care and treatment of the insane has been openly and freely discussed. By some it was held that the present system, which meant little beyond care and restraint, should cease to exist, and that for acute cases, at all events provision should be made in harmony with modern hospital ideals. So many perplexing problems intrude in a question of this character, that, for their solution, it was thought well to seek light where already hospitals for the insane, or psychiatric hospitals, had passed beyond the experimental stage. Germany has given to the world in recent years a remarkable example of industrial expansion. Technical education has found a field or created one for its own development. But it is perhaps in medical science that Germany has made her greatest advance. To Germany, therefore, we went to see what was being done in the world of psychiatry. Of course it could not be expected that anything like a critical study could be undertaken, in the time at our disposal.

In Germany all roads lead to Berlin, and therefore Berlin was the first objective point. It is a beautiful city, though unfortu-

nately too little time could be given to a study of its architectural beauty, and artistic advantages.

The hospital " La Charite " is the center of university medical life in Berlin. The psychiatric clinic is a department of the hospital in connection with the University of Berlin, and bears the same relation to the University as do the departments of medicine, surgery and obstetrics. The term " clinic " is applied to all those various hospitals. The psychiatric clinic is presided over by Professor Ziehen, who is appointed by the University of Berlin. The clinic is supported entirely by the university funds and by the fees of the patients.

We were very courteously and kindly received by Professor Ziehen, who personally conducted us throughout the institution, entering fully into every detail of administration, of treatment, and also into the methods of scientific investigation. There are two departments, one for the study and the treatment of the insane, and the other for neurotic diseases, organic and functional. Exception has been taken to the method of thus combining these two classes of patients. It does seem, however, that in a clinic where educational and scientific advantages are important, the wide pathological field afforded by the various neuroses ought not to be neglected.

In the psychiatric clinic there are 160 beds, and in the clinic for nervous diseases about 70. The institution is conducted purely on the hospital system. It is well equipped throughout with modern hospital appliances for treatment and research work. There are laboratories for gross and microscopic anatomy, experimental physiology, micro-photography, neurological research, and so on. It is supplied with electro-therapeutic and hydro-therapeutic apparatus, the various forms of hot air baths, sand baths and other therapeutic necessaries. Every department, whether clinical or scientific, is under skilled expert directors, aided by a capable staff of assistants. All assistants do clinical as well as laboratory work. The physicians are appointed by the State, on the recommendation of Professor Ziehen, the director. Besides the physicians holding official positions, there are many clinicians, and laboratory workers from the University, and others doing voluntary duty. The patients are kept in bed, carefully nursed

and attended. During the day there is one nurse to every four patients, and one nurse to six patients at night. This number may be increased at any time should necessity demand. For the more disturbed patients single rooms, four in number, are provided, and where required deep padded beds are also used for this class. I cannot say that these beds commended themselves very highly to our judgment. Padded beds, padded rooms and all such, should follow stone walls and iron bars to the limbo of forgotten things.

Small wards, from seven to ten beds, abound throughout, thus affording better opportunity for classification and for clinical purposes. The patients are retained in this institution so long as they are of scientific interest, or respond to treatment, and no longer. The chronic insane patients are then sent to the many asylums in and around the city. The neurotic patients, if chronic, are sent to the institutions for the care of these chronic maladies. Twenty-five hundred patients pass through the clinic in one year.

We visited the asylum at Daldorf, near Berlin. There are 1200 patients in this institution. These patients are received, some from the psychiatric clinic and others direct from the city of Berlin and the towns adjacent thereto. There is a staff of 14 physicians for the 1200 patients. For asylum purposes the staff of attendants is quite ample, in the ratio of one to every five patients. The criminal insane are confined in separate buildings.

We visited the asylum at Buch, which is also situated near the city of Berlin. This institution is built on the cottage system and was erected last year. The buildings are of magnificent architectural design, and occupy a very desirable locality. The buildings number some twenty in all. The interior of every department is well lighted and the space allotted to each patient is particularly commendable. There are 14 physicians on the staff, and one attendant to every four patients. Some distance from the other cottages is situated the building for the insane criminals; they are not allowed to mingle with the other patients in any way; they are, however, kept employed and their life is made tolerably happy. In fact the German method of dealing with the criminal insane, and the insane criminal is worthy of mention. For six weeks they are kept under close observation and subjected to the

most searching examinations. In this way it is quite impossible that deceptions can be carried out, or that mistakes in diagnosis can be made, at all events in either case such an incident would be quite rare. The importance of this method in criminal proceedings must be obvious to all. The unseemly wrangling and contradictory evidence of opposing physicians in criminal trials is entirely wanting in Germany. "Justice is best served by those who can serve justice best."

The patients in this institution are received from the psychiatric clinic, from the city of Berlin, and from the surrounding districts.

Of course the greatest possible interest centered in our visit to Munich. So much had been said and written regarding the famous clinic of Kraepelin, that we were naturally anxious to come within its sphere of influence. Our anticipations were high, yet we were not disappointed. The Munich clinic marks a departure in psychiatry. It is an entire breaking away from our previous point of view with regard to the insane. Here insanity is regarded as a disease, that should come under the earliest possible treatment. This treatment should be carried out in properly equipped hospitals, with an ample and well-trained nursing staff. As a disease it should receive the same clinical and pathological observation and study as are awarded to the other departments of medicine.

Prof. Kraepelin received us at the clinic with the utmost personal consideration, and one of his staff was in constant attendance during our visit.

The building was erected in 1905, by state funds, and is most modern in every respect. The site was given by the city of Munich. The psychiatric clinic is closely associated with the University of Munich, in fact is one of its most important sections.

Prof. Kraepelin is dean of the medical faculty, and his first assistant, Dr. Alzheimer, is assistant dean. The exterior of the building is of modest though pleasing design. The interior is well arranged, fitted and equipped with all the modern accessories for the treatment and study of the various forms of insanity. Conveniences and appliances for hydro-therapy, hot air baths, vapor baths, electro-therapy, abound throughout. On the scientific side the institution is particularly strong. Well-equipped

laboratories for all forms of original research work, as applied to psychiatry, exist. These are under the direction of skilled observers, who have everything required in men and means for their work. Pathology, experimental physiology and anatomy are studied with care and skill.

The drawing and coloring work are under skilled artists.

All forms of mechanical devices for differential diagnosis are installed; these are designed and manufactured by a member of the staff. Some of the apparatus is excellent, some appears ultra-scientific, but all acknowledged to be for experimental purposes. Guinea-pigs, monkeys, rabbits, sheep, are kept alive on the premises, for experimental study and research work. There is a polyclinic associated, which is under the charge of Prof. Gudden, who is appointed direct by the University. Herein all classes, the insane, neurotic, epileptic, inebriates, are received; here they are studied, classified and allotted. The insane are transferred to the psychiatric clinic, the other classes are sent to "common" hospitals. The patients are retained and treated in the clinic while they are of scientific interest, say from one to three weeks and longer if necessary. If recovery takes place they are discharged. If the cases tend to become chronic, they are sent to the asylums, in the vicinity of the city. A very large percentage of the cases are alcoholic. Beer is King of Bavaria, the state owns the breweries, and of course every loyal subject must drink to the health of the commonwealth. Sometimes "schnapps" are added to the daily collation of beer and then there is trouble and—the clinic. The inebriates are the cases that respond most quickly to treatment, and the clinic has established a special record in this respect both here and in Berlin.

The method of admission is worthy of attention. Voluntary patients are received at the clinic, without certificates. If dangerous to the State the patients may be brought in by friends, by physicians, or they may be committed by the courts. Certificates may be made out by outside physicians, or by members of the staff. In fact there appears to be no regular system of admission, the object being to get the patient to the hospital with the least possible loss of time. The wife or husband of an alcohol or drug inebriate may commit to the clinic the other partner

most searching examinations. In this way it is quite impossible that deceptions can be carried out, or that mistakes in diagnosis can be made, at all events in either case such an incident would be quite rare. The importance of this method in criminal proceedings must be obvious to all. The unseemly wrangling and contradictory evidence of opposing physicians in criminal trials is entirely wanting in Germany. "Justice is best served by those who can serve justice best."

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Prof. Kraepelin received us at the clinic with the utmost personal consideration, and one of his staff was in constant attendance during our visit.

The building was erected in 1905, by state funds, and is most modern in every respect. The site was given by the city of Munich. The psychiatric clinic is closely associated with the University of Munich, in fact is one of its most important sections.

Prof. Kraepelin is dean of the medical faculty, and his first assistant, Dr. Alzheimer, is assistant dean. The exterior of the building is of modest though pleasing design. The interior is well arranged, fitted and equipped with all the modern accessories for the treatment and study of the various forms of insanity. Conveniences and appliances for hydro-therapy, hot air baths, vapor baths, electro-therapy, abound throughout. On the scientific side the institution is particularly strong. Well-equipped

laboratories for all forms of original research work, as applied to psychiatry, exist. These are under the direction of skilled observers, who have everything required in men and means for their work. Pathology, experimental physiology and anatomy are studied with care and skill.

The drawing and coloring work are under skilled artists.

All forms of mechanical devices for differential diagnosis are installed; these are designed and manufactured by a member of the staff. Some of the apparatus is excellent, some appears ultra-scientific, but all acknowledged to be for experimental purposes. Guinea-pigs, monkeys, rabbits, sheep, are kept alive on the premises, for experimental study and research work. There is a polyclinic associated, which is under the charge of Prof. Gudden, who is appointed direct by the University. Herein all classes, the insane, neurotic, epileptic, inebriates, are received; here they are studied, classified and allotted. The insane are transferred to the psychiatric clinic, the other classes are sent to "common" hospitals. The patients are retained and treated in the clinic while they are of scientific interest, say from one to three weeks and longer if necessary. If recovery takes place they are discharged. If the cases tend to become chronic, they are sent to the asylums, in the vicinity of the city. A very large percentage of the cases are alcoholic. Beer is King of Bavaria, the state owns the breweries, and of course every loyal subject must drink to the health of the commonwealth. Sometimes "schnapps" are added to the daily collation of beer and then there is trouble and—the clinic. The inebriates are the cases that respond most quickly to treatment, and the clinic has established a special record in this respect both here and in Berlin.

The method of admission is worthy of attention. Voluntary patients are received at the clinic, without certificates. If dangerous to the State the patients may be brought in by friends, by physicians, or they may be committed by the courts. Certificates may be made out by outside physicians, or by members of the staff. In fact there appears to be no regular system of admission, the object being to get the patient to the hospital with the least possible loss of time. The wife or husband of an alcohol or drug inebriate may commit to the clinic the other partner

to the matrimonial contract. All patients must pay a weekly rate of 50 marks, but this is not strictly enforced.

The staff of physicians is very large, some appointed by the State, some voluntary workers, others clinical assistants or house physicians from the universities. All appointments to the staff must be approved by Dr. Kraepelin. The nursing staff is particularly large, one nurse to every two patients, and more are added if required. The common hospital which is under the same management is adjacent to the clinic, and extra nurses can be provided at once should urgency demand. Patients are kept in bed, carefully nursed and attended. The disturbed patients were so nursed and kept under such close observation, that there was a remarkable absence of noise and confusion.

Both here and at Berlin the clinics are situated in a busy part of those busy cities; such is necessary for the convenience of patients, as well as for the educational and scientific end the clinics are intended to meet.

All the men associated with the clinic are particularly able in their various lines. Kraepelin is justly recognized as the foremost alienist of his day. He is also particularly strong in hospital organization and educational management. His first assistant, Dr. Alzheimer, is particularly distinguished as a neuro-pathologist, and occupies that position for the University. Dr. Gudden, of the polyclinic, is appointed by the University and is an exceptionally clever man.

Dr. Plaut has distinguished himself already by his research in syphilis and paresis. Dr. Mooers, a lady physician from America, is a well-known laboratory demonstrator and master of technique. We might also mention Dr. Rien, who does splendid work as assistant clinician. All of those were exceedingly kind to us, and gave us every possible help to study and understand their various methods of work.

We visited the asylum at Eglfing, which is quite near Munich. This is the most modern asylum in Southern Germany, having been erected in 1905. It is built on the cottage system, and comprises a whole village of upwards of 80 buildings. The white walls and red roofs give it a most artistic appearance. One thousand and forty-one patients are confined therein, with accommoda-

tion for 200 more. There are ten physicians in charge. The wards were clean and the patients treated with the utmost consideration, though I must say that we did not see much or any evidence of scientific studies, or investigation.

The cottage system as carried out here, did not seem to meet the approval of those in charge; it was carried too far. The multiplication of buildings increased the work of the staff unnecessarily, and lessened that close supervision on the part of the physician, so essential for the best treatment and administration.

On all sides we were received with the greatest attention; in fact, with unusual consideration. The object of our visit appeared in the public press, and was therefore quite well known even before our arrival.

In Berlin and Munich the psychiatric clinics were brought in the closest possible relation to the universities, for clinical and teaching purposes. Every accommodation and encouragement was given the students in their clinical work. In addition to the laboratories already mentioned, magnificent lecture amphitheaters, capable of holding a large number of students, and equipped with modern conveniences, formed an important element of the clinics. The various psychoses were treated exhaustively by the teachers, and elucidated by means of the patients present.

Criminals are admitted to the clinics for the purpose of observation and study. During our visit demonstrations were given and lectures were delivered on this type of patients, by Profs. Ziehen and Alzheimer, before their respective classes.

Clearly psychiatry receives its fair share of attention in Germany. When one witnesses day after day a large class of students, closely following practical demonstrations by eminent professors, the value of the clinic as an educational factor is well established. The development of the hospital idea, and the "open door" of admission, go far to break down the feelings of dread and shame associated with the word "asylum." Whether it be viewed with regard to the mode of admission, the advanced, skilful, energetic method of treatment, to the scientific and research character of the work performed, or to the great educational advantages accruing to the community, the hospital system possesses surpassing advantages. Situated as these hospitals are, in uni-

versity centers, with the stimulating and energizing atmosphere thus engendered, under the constant stimulus of original investigation and medical advancement they cannot but bring about the best results. At the same time we should have a care that the hospitals for the chronic insane should not be sacrificed, should not be allowed to degenerate into mere custodial institutions. Such a condition would be intolerable in this country, no matter what may obtain abroad. There is need for modern methods in hospitals for the chronic as well as in those for acute cases, need for skilled treatment, careful nursing, for scientific equipment. The necessities of the one need not and should not be sacrificed to the luxuries of the other. A wealth of almost unexplored clinical material is there at hand, and the pathologist must find herein labors rich in results.

Into the student life of Germany we were privileged to have a look. Song and story from "old Heidelberg" down have thrown a charm, a glamor, around the German student days, and hedged them about with customs and traditions, that in other educational centers have long ceased to exist. He has his beer, he has his affairs of the heart; what student has not? But it is another affair one cannot but remark, the "affair of honor," a striking characteristic of German student life.

Loyalty to his university, to his professors, whom he regards with the greatest awe, is a pleasing characteristic of the German student. Nor is anything wanting to perpetuate in the students' minds the fame of the immortals who have passed away. "In storied urn and animated bust," their names and deeds are recorded, while the Virchow hospital and Billroth laboratory, well indicate the love and reverence for the men who have kept the flame alight on the altar of Aesculapius.

At Zurich the asylum is under the direction of Dr. Bleuler. The pathologist, Dr. Jung, was absent on military duty at the time of our visit, and that department was closed "till the war is over." There was nothing especially new in Zurich. The apparatus in use by Dr. Jung, for experimental purposes, was very interesting. In fact the various appliances for work on association word tests, the reading of the emotions, and so on, was quite bewildering. Time alone will tell their value.

And here it may be remarked that in a great many instances the use of mechanical appliances in psychiatry was of admittedly doubtful utility. Their absolute uselessness in many instances was frankly acknowledged, yet even those who worked out the failure were happy; they had been doing something.

From Zurich we directed our steps towards Paris. The heated term, the closing of the medical schools, and I am free to add, a limited vocabulary in the language of France, made progress a little slow. However the visit was not without its interesting and instructive features. As is well known, France has always taken an advanced position in medicine and surgery. Especially is this true in research work, in pathology, bacteriology and chemistry. In the whole field of psychiaty what picture stands out so prominent as that of grand old Pinel, striking the chains from the wretched bodies in the Salpetriere? At the present time it may be asserted, that in psychology France has many noble exponents, while in neuro-pathology no names stand higher than those of Charcot, Raymond and Dejerine.

No recent advance has been made in the realm of psychiatry so far as we could observe. The asylum system is still in vogue. Indeed in one institution of historic renown, we found the insane, neurotic, and the aged indigent, under the one administration. Signs are not wanting, however, that a different spirit will soon prevail.

Claybury, near London, was selected as representing the best English asylum, and as being associated with the research labors of Dr. Mott. It is beautifully situated, and nothing is wanting to the material welfare of its large number of patients.

Dr. Mott was absent at the time, and the pleasure of a meeting was missed. While the pathological labors of Dr. Mott are well known, Claybury is not contributing extensively to the clinical or educational wealth of the nation. The hospital idea was not prominently in evidence.

We spent a pleasant day in Craig House and Morningside, near Edinburgh. No more delightful situation could be selected. The grounds are kept with the traditional care and skill of the "Old Country." Kindness in a marked degree was extended to the patients.

In connection with Morningside are the laboratories of Dr. Ford Robertson, whose work on lumbar puncture, and the diphtheroid bacillus, have brought him renown.

Students from Edinburgh University attend lectures at Morningside, delivered by Ford Robertson and others of the staff. We were much disappointed in not seeing Dr. Robertson, who was absent. A talk on his methods would have been a pleasure.

A pleasant termination to our journey yet remained, in a visit to some of the more advanced asylums of Ireland, at Dublin, Waterford and Clonmell. We were met at each place with true Irish heartiness. Richmond asylum, under Dr. Norman, is certainly well conducted. In one respect it excelled, in art if not in science. By this is meant the industrial arts, for one could scarcely credit the skilled handiwork turned out from Richmond. A splendid pathological laboratory was attached to the hospital, but, from want of proper financial assistance practically no work was being done.

At Clonmell, the foundation was laid for a hospital for consumptives. While in many places the want of such a hospital was urged, this was the first actual step taken.

I am afraid I have already unduly prolonged this paper; and yet it contains merely a skeleton of what one would desire to construct. I only wish I could make the reading of it as interesting to you as the actual experience of the visit was to myself.

NOTES ON SOME OF THE PSYCHIATRIC CLINICS AND ASYLUMS OF GERMANY.

By C. K. CLARKE, M. D., LL. D.,

Professor of Psychiatry, Toronto University.

Our first experiences were acquired in La Charite, in Berlin, where we were fortunate in being piloted by Prof. T. Wesley Mills, of McGill University. Prof. Mills has spent several years in Germany and gave us much valuable advice in regard to the pursuit of our studies. The warnings were not without results. We were received with the greatest consideration and kindness everywhere, and regarded as students eager to acquire knowledge. As such all doors were opened. It may be confessed that these doors were at times a little long in opening, but that was only where we were seeking interviews with the younger professors, who had not enjoyed great distinction long enough to wear their honors without embarrassment. In Berlin we were at once pleasantly greeted by the eminent Prof. Ziehen, who asked us to meet him at 7.30 next morning. Of course we were on time, and the promptness with which this exceedingly active German met us, made us suspect that our enthusiasm in the search of knowledge was being quietly tested. However, the brevity of the continental breakfast makes many things possible before noon in Germany, and if there was an excess of virtue on the part of any one it was with us, because we not only rose early, but we did not indulge in the afternoon nap, which is a well-recognized function in many parts of the Old World. We merely mention this to show that the early bird has, after all, to take time to digest the unfortunately excessively virtuous worm.

Prof. Ziehen is an unusually energetic man, who covers a surprising amount of territory in a day. He is eminent, particularly as a psychologist, although in his clinic he is both psychiatrist and neurologist, a combination of offices likely to overburden any one person, although it must be remembered that Prof. Ziehen is not to be judged by ordinary standards.

The Psychiatric and Neurologic Clinic at Berlin is not a modern building, and in many respects its equipment is inferior to that of the newer places, but it is doing an important work, although hampered by a want of funds. It is supported by the University and by fees received from patients whose friends are able to pay for their care. There is a connection, too, with the Federal Government, the hospital having been provided by Frederick for military doctors. As a result, the staff always has an army physician included among its members.

It is perhaps unfortunate that the clinic attempts to treat both nervous and mental diseases, as neurotic patients, whose mental status is not affected, are plainly not suitably housed in a psychiatric hospital. We are thoroughly in accord with what Prof. Kraepelin says on this subject:

> In a number of newly-found clinics, the treatment and teaching has also been extended to the province of nerve diseases. Greisinger, and after him above all, Westphal and his school, have strongly emphasized the fact that mental diseases simply form a special group of nerve diseases and therefore may not be separated from them.
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> Undoubtedly the example of neurology, which has advanced so rapidly in the last ten years, cannot be too highly valued by the alienist because it refers him to the careful observation and examination of all bodily disturbances, and above all to the thorough investigation of the finer formation of the brain-structure and its changes in disease. That does not alter the fact, however, that insanity and nerve trouble stand quite independent of each other, in the realm of medicine, and further, it cannot be denied that neurology has gained far more than psychiatry has from the zealous work of the alienists. Psychiatry has had to stand aside and investigators have chosen the more accessible and hopeful questions of neurology. Brain tumors and rare diseases of the spinal column have always found willing workers in the psychiatric clinics, as the contents of our publications and the reports of our meetings show; while the great, unexplored realm of Seelenheilkunde (soul-saving science) has lain fallow.
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> This very development has been one of the most important causes of the estrangement between clinic and asylum, and which has had a retarding influence on the scientific life in the asylums. The practical alienist was cut off, for reasons not far to look for, from the study of nerve diseases so important to him. To the question which his daily work brought before him, his guides and teachings had no answer; indeed, scarcely any understanding. For this and other reasons I cannot join the majority of my colleagues, in the hot battle that has again broken out between inner medicine and psychiatry, over the immediate realm of neurology.

Although I am of the opinion that a thorough neurological training is indispensable to the alienist, and *vice versa* the neurologist requires even more psychiatry.

We hope to conquer a large province which up to the present the isolation of the insane asylum has made difficult. The large group of so-called nervous diseases: that is, the patients who really need the help of the psychiater, but who are not in the ordinary sense mentally affected, or who could not be taken to an asylum, we claim with a perfect right. We demand a free reception and a free department for their treatment in our hospitals.

We had ample opportunity to compare institutions of the two classes and the comparisons were all in favor of the psychiatric hospital.

The official staff is composed of a director (Prof. Ziehen), and five assistants—one assistant from the army. Four of the assistants are attached to the psychiatric department, two to the neurologic wards. In addition to this, voluntary assistants are taken on as required, to keep records in both clinical and clerical work. There is not any special assignment of duties, except that already referred to.

The number of beds is 230, 70 of which are in the wards for nervous diseases. Of course the whole clinic is conducted strictly on the hospital plan; but everywhere there was the suggestion that there is a lack of funds to carry on the work as it should be done. This impression was fully confirmed later on, when we visited Munich.

Nurses in the proportion of one to four or five patients in the day, and one to six at night, are employed, but the physicians did not speak enthusiastically of them. They are not of the highest type, because the remuneration offered is too small to attract persons who are educated and intelligent. This is rather remarkable in a country where education is held at such a high estimate. However, the nursing profession, as a whole, in Germany, does not compare favorably with American, as it has not attracted the attention of the same class of women.

There is no interchange of nurses between the clinic and the general hospital. The night service is without a physician unless one is specially summoned.

As a whole, the clinic is bright, cheerful, and with abundant air-space for each patient. Indeed, in all of the institutions we

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As a whole, the clinic is bright, cheerful, and with abundant air-space for each patient. Indeed, in all of the institutions we

visited great attention was given to this important point. The iron bedstead is not as great a favorite in the old countries as with us, and we are rather inclined to favor our own choice in this matter, as for institution purposes iron bedsteads have much to commend them. German bedding arrangements, at any rate, are so absolutely different from our own that it would take more than a two months' jaunt to accommodate our eccentricities to those of the much-puffed-up and elusive foreign feather coverlet. We always regarded it with awe and curiosity and if we did not deposit it on the bedroom floor before retiring it generally made its way there in a few minutes, of its own accord. Just why it was "evolved" is an unanswerable riddle to the transatlantic mind.

Here, for the first time, we appreciated to a great extent the difference between hospital and asylum. The wards were decidedly of hospital type in arrangement and management, and the form of admission enabled the early case of mental trouble, access, without the formality of certification. True, there are some subtle intricacies to be gone through with at times, but when urgency demands, the patient is very promptly admitted, passing to the epileptic ward, from which he is transferred as occasion requires. If certificates are necessary and the patient is poor, only one certificate is made by an outside practitioner, the other being furnished, without cost, by a member of the clinic staff.

Alcoholics and epileptics are admitted without certificates, under certain circumstances. For example, if an alcoholic case is willing to undergo treatment his wife can obtain admission for him, but a father cannot have his son committed without a certificate.

The patients come from the city of Berlin as a rule, but some reach the clinic from outside towns. These must contribute a mark (25 cents) a day more than those from the city. All classes are admitted, and indigent patients are supported by the municipality. No less than 2500 patients are treated in a year, and this fact alone makes it apparent that the psychiatric hospital reaches cases in the incipient stages in a way impossible by the asylum system.

Of course the clinic is a large sifting department and many of the admissions who prove to be hopelessly insane, scarcely pause on their way to the asylums at Daldorf and Buch.

The charges are from three to four marks a day and in addition to the municipal support there is a mutual insurance system in vogue, which comes to the relief of many poor persons. The organization of the Kranken Kasse is extremely interesting.

Patients are retained in the institution as long as there is prospect of an early cure, or while they are of scientific interest. It must be remembered always that a patient in Germany is not viewed from the same standpoint as we regard him. His material comforts are not as carefully considered, in fact he does not look for these as he has not been accustomed to them. We would suppose that his personal feelings were not thought of to as great an extent as might be advisable, but that is simply a question of custom and usage.

The equipment for treatment is elaborate and good, and, as was to be expected, the hydro-therapeutic apparatus figures largely, more largely than would have been the case if there was not a combination of nervous and mental cases.

Among other things we observed baths of the following types: vapor, electric, faradic, carbonic acid, local, steam, douche, continuous, and sand.

The continuous baths are largely used for the control of excitement, and patients live in them for days.

The laboratory equipment is excellent, and ten or more rooms are devoted to scientific research, however, it appeared to us that the staff was too small to accomplish all in this line that could be desired.

There were rooms for kinesthetic experiments, gross anatomy, microscopical research, photo-microscopy, experimental physiology, neurological research, etc.

The assistants appear to be under very strict discipline, and have a military bearing characteristic of Germans. Perhaps the fact that a standing army is an x quantity with us makes the militarism of Europe more striking than it would be if we were accustomed to it.

The educational side of the institution is admirable. There is a large and splendidly equipped lecture-room, with seating accommodations for 250 students. Here clinics are given regularly by Prof. Ziehen and others to medical students, and the practical German thinks it advisable to have the law students acquire some

real knowledge of insanity other than that which is shown by an ability to expound the right and wrong theory with an accuracy that makes the physician marvel how British law became such an exact science.

We left the clinic strongly impressed with the idea that here was something to our liking, and yet not completely satisfied that the highest development of the possibilities had been attained. It was not until Munich was reached that our ideals were approached.

Before going abroad we had been careful to obtain as much information as possible regarding European methods and knew pretty well what to expect. It was interesting, though, after reading Dr. Brush on "Foreign Hospitals for the Insane," published at as late a date as 1905, to find how much Germany had advanced, even since that time. Munich was then just about opening, and Berlin, Kiel, Heidelberg, Giessen and other clinics were setting the pace. If Dr. Brush had foreseen the realization of the ideal at Munich possibly he would have modified his pessimistic conclusions regarding the possibility of establishing clinics in America.

We must say that whatever the drawbacks may be in the United States, we have more confidence in the sense of both government and people of Ontario than to believe that Dr. Brush is correct in his conclusions. Mistakes have been made and the era of false economy has been passed through, but the establishment of clinics means the disappearance of the very evils Dr. Brush complains of. As for the stigma attached to going to the asylum—no matter how much we recognize the greatness of the popular error—we cannot help but sympathize with it and be willing to go far to lessen the feeling of degradation which undoubtedly exists.

As a matter of fact the conditions in Ontario are ideal for the establishment of a clinic and are similar in every particular to those in Munich, viz., a large State University—a new hospital of provincial importance and a progressive and thoughtful government.

Our first visit to a German asylum for the insane was made at Daldorf, near Berlin. We were informed that this was an institution of much importance, but found that it was not so re-

garded by those in touch with the facts; Daldorf is old and in many respects out of date, but provides accommodations for 1200 patients. Two things struck us at once as showing that the interests of the patients were keenly looked after. First there was a staff of no less than 14 physicians; second, the nurses numbered one to five patients; a proportion that in most institutions in America would be regarded as excessive by those who have to "pay the piper." If we were to judge the German asylums by the attention given to what we would call material comforts they would be found sadly wanting, but it must be remembered at all times that social conditions in the two countries are absolutely different, and what are regarded as the essentials by us are considered luxuries by the Germans. From their point of view every necessity is supplied and we heard no complaints from patients. As is the case in all the best institutions in America, restraint is not used in any form, and if seclusion is resorted to it is under conditions that do not call for criticism. A room is not converted into a veritable dark cell by the use of heavily wired and guarded shutters, but plenty of light is provided, the window being glazed with a very thick form of plate glass which is practically unbreakable. Thus the necessity for special precautions against suicide is done away with; an important detail, which will be much appreciated by the practical asylum man.

We were not so favorably impressed with the method of nursing weak and uncleanly patients in wooden beds with sides three feet high. These wooden boxes were padded and in many cases filled with wood wool, an absorbent that the Germans claim saved a world of worry and care. Perhaps we were prejudiced, but the whole apparatus did not appeal to either the æsthetic or the practical sides of our nature. We felt that the method might be open to honest criticism.

The grounds and surroundings at Daldorf are very beautiful and there was an air of contentment among the patients that was pleasing.

On the day following our visit to Daldorf, we went out to Buch, a new asylum, with a very large number of patients. Buch is arranged on the cottage plan, there being in all about 20 buildings. Again we found a large staff of 14 physicians, and nurses

in the proportion of one to four patients. There was a splendidly equipped laboratory, too, with every facility for advanced pathological and psychological research, but the impression was left on our minds that this could not be satisfactorily undertaken with the staff on duty. If that is the case in Germany, what can be expected in many parts of America, with staffs proportionately two-thirds smaller? Plainly the inference is that hospitals and asylums can rarely, if ever, achieve the best results under the same roof. Everywhere we went this impression was forced home in such a way that we came away fully possessed of the indisputability of this conclusion. Such was the case at Daldorf, and Eglfing, of which we shall speak later on.

At Daldorf and Buch, we had opportunity to observe and study the German method of dealing with the criminal insane criminals. At Buch we were particularly interested in what is being done to make the best of these difficult classes. They are housed in an isolated building where there is no possibility of their coming in contact with the other patients. Their surroundings are comfortable and cheerful, but best of all is the earnest endeavor made to provide the most suitable employment for them, where, for obvious reasons, farming and gardening operations are excluded. It is difficult to find an outlet for the energies of a class which, above all, should be occupied. The ability shown in solving this problem was striking and it was possible to say at Buch that the criminals were just as thoughtfully cared for and treated as the patients in other parts of the asylum. The occupations developed were many and the bent of the individual was carefully studied. At last we had seen the criminal insane doing something more than fretting out their souls in idleness.

Indeed, the whole conception of the status of the man who commits a criminal act as the result of disease receives a very different treatment in Germany from what it does in Canada and the United States, although better days are rapidly coming even here. If a man who has committed a crime, is suspected of being insane, he is sent to a psychiatric clinic, where he is under constant observation for six weeks, or longer if necessary. He is isolated from the other patients and the methods of examination employed are so searching and thorough that there is no possibility of a

malingerer making good his deception. The common impression that it is a simple matter to simulate insanity is an erroneous one. Be that as it may, the only rational plan to render fraud practically impossible, is that adopted in Germany. Then again think what this plan saves the State in outlay.

At Buch and Daldorf enquiries were made to discover how thoroughly the psychiatric clinic in Berlin was doing the work of receiving the acute cases of the district. It was important to ascertain this, because some who are not enamoured of the clinic have made the statement that these institutions have as their inspiration nothing more than the providing of material for the medical student and physician. Now it is quite true that the educational value of the clinic is of the utmost importance, but no one need make the shallow criticism that here the function ends. As a matter of fact the cure of the patient is, and always will be, the main function of the clinic, but if the problems of causation and efficient treatment are to be worked out, it must be done in the laboratories of the clinic. Then again, if physicians are to have an intelligent conception of psychiatry they must acquire their knowledge by an actual study of patients in the wards of the hospital. A surgeon is not made in the quiet of the student's den—a physician is not evolved by the simple process of reading, and in an eminently practical science such as medicine, clinical experience is the *sine qua non*.

The result of our inquiries was to make clear the fact that practically all of the acute cases pass through the clinic, and many of the chronic as well. The people have just as much faith in the institution as in their general hospitals, where exactly similar conditions prevail. At Munich, too, this was made very plain, and what was more satisfactory still was the information that the case of an interesting patient was not lost sight of even when he left the clinic. If a study of his disease was likely to be of interest and use, the staff of the clinic still kept in touch with it. Every month, for example, Prof. Kraepelin of Munich attends medical conferences at Eglfing and Gabersee, two large institutions for chronics, with the express purpose of keeping in touch with some of the patients who had passed through the clinic. In some of the clinics 20 beds are reserved for cases of unique interest, the

study of which is likely to prove of particular value. For example, we found several lads suffering from the juvenile form of general paralysis, a disease so rare in Canada that it is practically unknown. It would have been a mistake to lose sight of such clinical material in the wards of an asylum for the insane.

We went directly from Berlin to Munich, but as the latter place occupied so much of our attention we shall treat of the other European clinics studied before discussing it.

After visiting Zurich we went to Tübingen, a quaint little town in Württemberg, but an important university center.

The psychiatric clinic in Tübingen has been built for 13 years and has accommodations for 120 patients. The director is Prof. Robert Gaup, a young man who attained some distinction in the clinic at Munich under Professors Kraepelin and Altzheimer. The staff consists of a director and five assistants. There are two voluntary assistants. The patients are admitted either voluntarily or by means of certificates. Tübingen being a small town with some 17,000 inhabitants, it at once became a matter of interest to compare its admissions with those of the clinics in the large cities. Two important facts came to light: first that the proportion of alcoholics was very much smaller, not more than 10 per cent being of this class; second, that the admissions were far fewer, not more than 700 in all being received in a year. General paresis, too, was much rarer, and the majority of the patients received belonged to the manic depressive or dementia præcox groups.

As far as the nursing equipment was concerned, there was nothing that we had not seen in other clinics. The continuous baths and other hydro-therapeutic appartus were much to the fore, and a good deal of attention was being paid apparently to electro-therapy.

Psycho-therapeutics are studied and employed in treatment whenever possible. The arrangement of the hydro-therapeutic apparatus was excellent, perhaps better than in most of the clinics visited, and on the whole it was apparent that the management of the Tübingen institution was bent on carrying on advanced work. Experimental work on word association in the Korsakoff-Syndrome was being done, but of course the supply of clinical material was much smaller than it would be in such centers as Munich and Berlin, where alcoholism is rampant.

Again the proportion of nurses was found to be large, about 25 for 60 patients, but difficulty is experienced in getting a suitable class of girls. It was stated by one of the physicians that in the Protestant parts of Germany it was almost impossible to induce women to undertake nursing. In the Catholic communities, such as Munich, the "Schwesters," or Sisters of Charity, cheerfully undertake this work.

Tübingen is open to neurological as well as psychiatric cases, but the proportion of neurological patients is exceedingly small and pretty well limited to those in which the mental condition is involved.

One of the striking features of this clinic is its splendidly arranged library; indeed its collection of psychiatric literature is probably the largest and best in Germany. Very large sums of money are expended on this library.

On the whole the clinic at Tübingen is admirable and when it is remembered that Württemberg is not a wealthy principality the rulers are to be congratulated on their liberal expenditure in such a splendid cause.

Giessen.

On July 28, 1907, we reached Giessen and found this little town in a state of ferment and excitement on account of the celebration of the three hundredth anniversary of the establishment of the University. It is not every university that can boast of an existence of 300 years, and very properly the graduates and undergraduates were making the most of the occasion. The city was a mass of evergreens and bunting, and the picturesque costumes of the Saxony peasants, who had come to town in large numbers, together with the gorgeous uniforms of the student classes, made a gay scene, and we were duly impressed by the fact that the German people know how to take advantage of the opportunity for a good time. The peasant women, in abbreviated, but very full pleated skirts, were among the most active we have ever seen, and they moved about with a vigor and alertness that was astonishing. The German student, though, was a revelation to us, and during our wanderings through Germany we saw him at his best and his worst. As a student he is a model to be copied and praised. His devotion to work is admirable, his results are splendid, but his

social customs and ideas of sport are not in common with ours, and it is doubtful if we may fairly judge him. To any one hailing from countries where intercollegiate sports are on a high plane, it is difficult to even guess at the German point of view in such things. To us their ideals appeared either trivial or repulsive. It so happened both at Tübingen and Giessen that an epidemic of student duelling was raging and the results were to us exceedingly distressing, and contrary to what are our ideas of honorable sport. It is bad enough to have players injured by accident in the hurly-burly of football, but if any footballer were to deliberately maim an opposing player he would properly be ostracized and condemned by all right-thinking companions. In Germany we found the students deliberately setting out to mutilate and disfigure each other for life. How well they succeed in their object was attested by the hundreds of hideous scars and recent wounds we saw on students in the streets and in the restaurants. That these wounds are considered honorable was plainly evident by the pains taken to attract attention to them, and the jaunty air of the wounded stripling in the presence of Dulcinea was proof positive that she shared the illusions of the youthful Don Quixote. It is said that this duelling is made sacred by the traditions of hundreds of years, but if we were to honor some of the dreadful traditions of days long gone by, this would be an extremely unpleasant country to live in. The Germans talked freely of the duelling custom and the older university men freely confessed that they would be glad to see it disappear, but seemed to think that while the exuberance of youth remained the game would be carried on.

The Giessen clinic was found, as was the case with others in Germany, situated in a part of the town where it was easily accessible to the student and physician. It provides accommodation for 100 patients. Prof. Robert Sommer, who is director, is a man of eminence and is known particularly in the field of psychology, being regarded as a man of great resource and originality. Some of his apparatus is wonderfully clever and his investigations of deep interest, especially those in connection with expression, etc.

Psychiatric and neurologic cases are received, each class being treated in a separate building. Epileptics and idiots are also cared for separately. The staff is composed of a director, four assist-

ants, and an army physician. In addition there are two or three voluntary assistants. Almost 400 patients are admitted in a year. Many criminals are received for examination and study.

The laboratories are splendidly equipped for research work and much original investigation is carried on by the staff. The anomalies of speech are studied by means of the graphophone, and important records in this way are preserved for future use and comparison.

Apparatus for the study of time reactions is most ingenious.

The Giessen clinic is constructed on the pavilion plan and is not regarded by some members of the staff as a success, and a difficulty is encountered in not being able to dispose of patients as they wish. This in a way accounts for the small number under treatment during the year.

The proportion of nurses is 32 to 90 patients, and the night service is decidedly small.

Some provision is made for paying patients in a small building which is comfortably furnished.

No beer is furnished the patients, although in some of the institutions in southern Germany beer was considered requisite, especially with the chronics, who will not work without it.

There is an outdoor or polyclinic department in charge of the assistant director, where some 200 patients are treated in the course of a year. The library for psychiatric literature is extensive.

On the whole, Giessen is rather suggestive of a compromise between hospital and asylum, and as such is not as attractive as some of the institutions visited. Possibly if we had not been at Munich before going to Tübingen and Giessen we should have been much more impressed by what we saw there.

Munich.

We have described in a general way several of the German clinics, but have reserved that of Munich until the last, as it represents the highest development in such institutions, and is worthy of far more detailed description: it is the ideal to which we should aspire, and is without doubt the best example of what the modern psychiatric hospital should be. Its management is fortunate in having such great men as Prof. Kraepelin and Prof.

Alzheimer associated in its management, and the selection of the assistants has been made with such discretion that success is easily ensured. Drs. Gudden, Moers, Plaut, Weiler and others have already won well-deserved fame, and the labors of this enthusiastic band have enriched psychiatric science in a remarkable way and have elucidated many of the most intricate problems we have to deal with. However, of this we shall speak later on.

Description of the Building.

The clinic is built in the form of a broad horse-shoe, and while plain and without excessive ornamentation, is pleasing from an architectural standpoint, the grey stuccoed walls and red tiled roof harmonizing. Even the wall about the clinic is graceful and picturesque, although of simple construction, but in perfect keeping with the clinic itself. In just such details we have much to learn from the Old World.

The clinic at once strikes the observer as being a building in which the definite aim has been to devote every dollar to the great humanitarian purpose for which it was constructed.

The principal department has a ground floor with three upper stories and main entrance. It is 105 meters in length. Three wings are attached, the east wing 37 meters in length; the west 45 meters long, and a middle wing about the same length. An enclosing wall with oval and round grated openings showing glimpses of the front gardens runs around the building.

The entrance is imposing, but in strict keeping with the requirements of the clinic. Near the entrance is the main staircase. The halls are towards the boundaries and the streets. The patients' rooms face the cheerful gardens almost exclusively. All ceilings and stairways are fireproof, and floors, generally, made of terrazzo. Many of the halls and rooms are covered with Pompeiian red linoleum of good quality.

Inside the entrance, through the chief portal, is the bright hall with a two-armed staircase, under which at one side is the porter's room, on the other side the office of the matron. Three hall doors show the visitor the division of the house. The left side, towards the east, is the division for women, the right for men. The middle part contains the rooms which belong to the management and attendants as well as those for scientific and study purposes. The

third story is principally for the last named and contains the apartments of nine physicians.

In the southwest pavilion are the apartments of the director.

The kitchen, laundry, etc., are at the rear of the main building; built separately but connected to the wings by covered corridors.

The arrangements of the wards are most complete and almost every imaginable detail necessary to ensure comfort and proper supervision has been thought out and cleverly applied.

There is no home for nurses, but they, as well as the orderlies and other employees, are accommodated in the clinic, an arrangement that might easily be improved on; however, as before said, the question of nurses and nursing has not received anything like the attention we have given it on this side of the Atlantic. More men are employed in the clinic than would be the case with us, and it is certain that a nurses' home would be an advantage.

The wards themselves are bright; plainly but comfortably furnished and cheerful, and consist largely of small dormitories, but few single rooms being provided. The chief part of the whole building and the two middle stories are devoted to patients' apartments, containing 100 beds, and, in case of emergency a larger number can be accommodated. There are at least from 1500 to 2000 patients received yearly, without reference to the outdoor department.

Nearly two-thirds of the patients are under constant and careful watch; only the trivial cases and convalescents are without night supervision. The night service is on the Scottish plan: each group of nurses taking duty for two weeks at a time, with complete rest during the day, in order to ensure reliable care of the patients as well as to save the strength of the nurses.

The single room is done away with, as Prof. Kraepelin explains, to avoid the well-known evils of isolation. He says:

> If we lock a patient in a padded room we have saved his fellow patients and surroundings from him, but we no longer know what his condition is, although we may listen to his screams or peer at him through a peep-hole. We can no longer speak of the real care of the patient. After a long battle on the part of alienists for the freedom of their patients, and the abolishment of the "raving cell," the celless treatment has taken its place.
>
> The disadvantages of the isolation, of which we need only mention the uncleanliness and the violence, are so apparent that no one who has once known the blessings of its removal will ever return to it. If we abandon

the locking up of excited patients we must use other means of judicious treatment. Aside from narcotics, which we consider only an emergency, and merely as temporary aids, we have at our disposal a course which, in spite of its startling simplicity and naturalness, has only been used widely within the last twenty years, viz., rest in bed. Since we have aimed at this principle for those just taken ill, and for excited patients, the insane asylum has lost most of its terror.

This being the practice, most of the patients are kept in bed as in the ordinary general hospital, so that the difference is not noticeable at a glance. For the convalescent and very quiet patients there are rooms for recreation and light occupation.

Excellent elevators made it possible to have many patients taken to the gardens, which are arranged with pleasant walks, fountains, and summer-houses. We found many patients in bed in the open air, others in invalid chairs, etc.

The ward arrangements included almost every possible detail necessary for the comfort and convenience of patients and nurses. Electricity is used wherever possible, and in many respects its application has been most ingenious.

Now that hydro-therapeutics are regarded as the *sine qua non* in the treatment of mental diseases, it was to be expected that the bath-rooms at Munich would prove an interesting feature. In this we were not disappointed and the same regard for detail that characterizes the whole institution was shown. As patients have frequently to remain in these baths for days or even weeks at a time it is essential that their surroundings should be made as attractive as possible, and it is surprising to find how cheerful even a bath-room can be rendered by careful attention to details. Continuous baths are of course a prominent feature, and in different parts of the clinic about every form of the modern douche apparatus is to be found. Electric baths and vibratory appliances are to be seen in the outdoor department. Electricity has been a disappointment in the treatment of mental disease, but in some forms of nervous trouble is useful. Portable baths are freely employed where the patients cannot go to the continuous bath-room. Electricity is made to serve the purposes of the physicians and nurses wherever possible, and some of the devices used are ingenious and labor saving.

The rooms in which the patients are examined have every convenience for the examining physician, and a dark room is attached so that the eye conditions may be satisfactorily observed.

The arrangements for the night service are well thought out; in fact one of the strong points of the Munich clinic is the attention given to the most minute details.

The purely medical side then is carefully organized, and nothing is left undone that will aid the patient to recovery.

Now as to the scientific work: Twenty beds are reserved for the study of cases of unusual interest. Some of these, at the time of our visit, were occupied by cases of juvenile general paresis, a disease rarely met with in Canada. By this plan the patients likely to afford opportunity for much needed observation are always available. When it is remembered that the staff of physicians is very large and that each case is looked into most carefully by the director and the assistants detailed to study it, and that it is considered by the staff at one of its daily conferences, it can easily be understood that the individual is not lost sight of, but on the contrary receives every attention possible. Those who have been accustomed to the very general and perfunctory methods of care and examination so commonly used in large asylums are somewhat surprised at the elaborate details insisted on at Munich. Of course the objection is sometimes urged that the excess of zeal manifested in the search of scientific facts is apt to induce the observer to neglect the personal comfort and best interests of the patient. This objection is not beyond the mark in some of the institutions visited, but at Munich is absolutely without force and it was clear that the welfare of the individual was not neglected. To those most familiar with the trend of modern methods, the psychological studies gone into at Munich and other clinics are most interesting. That this field of investigation will yield as brilliant aids to diagnosis and prognosis as some predict is doubtful, but at all events the addition of such is of great importance and the results astonishing. Dr. Weiler is in charge of this department, and some of his apparatus is of exceptional interest. Reactions of all kinds; word associations; memory; emotion; attention; fatigue, and a hundred other problems are attacked in original ways and results carefully preserved. If these

results are correlated with studies in normal psychology a good deal that is of use to the world may be added to literature.

In the ideal clinic the psychologists who study normal reactions should make investigations with abnormal subjects as well; in this way true standards will be found. In the Canadian clinics which will be brought into existence, relationship between the university departments of psychology and the clinic laboratories should be intimate.

There are rooms for psychic time measurement and for measurement of mental work. Another room is reserved for the ergograph, which contains the writing scales, the apparatus for measuring involuntary and reflex movements, for the observation of the influence of mental processes on the pupils of the eyes; respiration, heart beat, pulse beat. A silent room with padded, double doors and darkening arrangements insures the possibility of shutting out all sense excitation. A sleeping-room is arranged for the measurement of the depth of sleep.

The outdoor department, or polyclinic, as it is called, is under the direction of Prof. Gudden. His position is filled directly by the university without reference to the government. This is interesting in view of the relationship existing between government, city and university in the organization of the clinic.

The site of the building was given by the city of Munich, the only reservation made being that city patients should receive a preference in case any question of this kind should come up. The clinic was erected by the Bavarian Government and the officials are government appointees. At the same time many of these officials are on the university staff; indeed Prof. Kraepelin is dean of the medical faculty of the university. No appointment is made to the staff by the government without the recommendation of the director. Of course this works out that no one is appointed who is not *persona grata* both to government and university. It is universally recognized that the scientific side of the work is the important one, and men who combine executive and scientific ability are looked for.

So celebrated has the Munich clinic become that visitors reach it from all over the world, and so great is the ambition to get on its staff that its voluntary assistants may be selected from the

very best of the graduates. While we were there several foreigners were present; two even from Brazil. Americans, of course, have gone there frequently, but the Munich idea is that if any young man from abroad wishes to get what is best, he must have more than a fragmentary knowledge of German. If he has not this, there is much time lost; in other words, he should not go to Munich to acquire German, but to learn psychiatry. There appears to be a good deal of common sense in this style of reasoning. Above all, the visitor should be a student in the broadest sense, with his eye closed to the social seductions of this fascinating town, and if possible his mouth closed to the equally attractive Munich beer. The beer is excellent, the very best made, but even Munich beer has possibilities that are denied by its admirers. The two things that struck us with amazement in Munich were the beer and the radishes. If the youthful visitor must make his choice between these unique seductions, let him stick to radishes. They are stronger than the beer, but not so fatal in their results. It is significant that of the patients admitted to Munich psychiatric clinic, about 60 per cent are alcoholic. This should settle the argument in favor of the radishes, but if any doubt remains let the visitor see the first floor of the Hopfbrauhaus when it is fully occupied.

The outdoor department of the clinic is largely attended and gets in touch with many incipient cases of mental trouble as well as all sorts of neurological patients. Its work is most important both from the purely medical and research work standpoint. It is just as thoroughly equipped as any other section of the clinic.

The interest taken in these clinical lectures, even in July, was marked, and both in Berlin and Munich there was a full attendance of students. Evidently psychiatry is regarded as one of the most important branches of medicine. In Berlin some of the demonstrations lasted two hours at a stretch, but every one seemed interested, and in turn each student received opportunity to prove the amount of his practical knowledge.

There can be no question that psychiatry in Germany is on a higher plane than in America, and the attitude of the public to the clinic is very different from that of our own people towards asylums. The admission of the patient is free from circumlocution

and red tape. There is no complaint about illegal detention; in fact persons confined in the clinics are simply regarded in the same light as patients in other hospitals.

All this is creditable in Germany, as it is not many years since that country was apparently hopelessly behind in the way of treatment of the insane. Indeed the study of psychiatry, as pointed out by Brush, is comparatively a new field in medicine. Not only were their views narrow, but their methods crude, harsh and unscientific until a very late period. The English and French were years ahead of them in their knowledge and methods. Now the reverse is the case and in her great awakening Germany has not neglected psychiatry. Only the narrowest provincialism could make us shut our eyes to this truth, and such being the case it is manifestly our duty to be up and doing. It is not a case of being loyal to old ideals, but of creating new and better ones.

Notes and Comment.

RESPONSIBILITY OF PHYSICIANS SIGNING CERTIFICATES OF INSANITY.—In the May, 1908, term of the Superior Court of Baltimore City, a suit against two physicians who had signed certificates of insanity in the form required by the laws of Maryland, upon which the person named in the certificate in question, a woman, was committed to, and for a period detained in, an institution for the insane in the State, was tried upon the following issue as stated by the presiding Judge, Hon. Thos. I. Elliott:

> The case in a few words is this: That the two defendants here entered into a conspiracy with the husband of the plaintiff in this case, for the purpose of depriving her of her liberty by incarcerating her in an insane asylum; that the two defendants in this case, knowing that she was sane, or knowing such circumstances with regard to her that ought to have told them, as reasonable, prudent and skillful physicians, that she was sane, notwithstanding that knowledge, actually possessed by them, and notwithstanding the responsibility which the law placed upon them to have that knowledge, entered into a conspiracy as between themselves and along with the husband of this plaintiff, and certified to a fact which they either knew was not true, or ought to have known was not true, if they had availed themselves of the opportunities which they had, and had applied to those opportunities the skill which, as physicians, the law implies they had.

Upon the prayer of the attorney for the defendants, Mr. John L. Sanford, of the Baltimore Bar, at the conclusion of the testimony of the plaintiff, the effect of the granting of which would have been to take the case from the jury, Judge Elliott, in continuation of the statement of the case, after reviewing the testimony and declaring that there was nothing in the testimony which would support the allegation of conspiracy, and therefore dismissing that count of the complaint, further said in reference to the allegation of mal-practice and false imprisonment:

> Now, the other feature of the case, as I understand it, is this: In a situation where they had reason to believe and every opportunity of discovering whether or not the plaintiff was insane, and in a situation where men who had the knowledge which the law presumes they did have would

have known she was not insane, they issued these certificates to the effect that she was insane and that her insanity was of that character and that degree which justified her detention in some institution. Now, that is the strength of the complaint, and the strength of the testimony must equal it, and must be such as would necessarily lead the jury into believing that these two defendants did what was complained of them.

The plaintiff, in the course of the case, and under what were considered the exigencies of the situation, put one of the defendants upon the stand, and asked that defendant as to the circumstances under which his certificate had been issued. As I have already said, it must be shown that these certificates were issued by the physicians falsely and fraudulently, and issued at a time when the physicians knew the facts that they were stating in them were untrue, and also knew that the effect of those untrue statements was to deprive a woman who was entitled to her liberty of that liberty. This witness, in the course of the examination, gave facts and gave circumstances, no one of which has been contradicted, or, certainly, not all of which have been contradicted, by any testimony to the contrary offered by the plaintiff herself, which facts and circumstances the witness, Dr. Rennolds, said led him to think that the woman was insane, and was in that condition where she ought to be sent to some institution for treatment.

Now, it is not to be forgotten that the act of the physicians could have been performed by them, that both of these certificates could have been signed by these physicians, without this plaintiff ever having been detained in an institution. The certificates were simply steps in the procedure that was taken, not by the physicians, but by the husband of this plaintiff. They were not, therefore, things which necessarily compelled the result. They were not even the steps which were necessary to the detention of this woman, because this woman might have been sent to this institution, and might have been detained in this institution, through other means than the certificates of the two physicians, and there is not anything, as a necessary conclusion, to be drawn from the acts of these physicians to show that they were responsible for such detention. While they might have surmised, and while they doubtless knew it was intended that these certificates were to be used by the husband of this woman, there is nothing as a necessary conclusion, in the signing of those certificates which necessarily convinced these two physicians either that the woman was to be sent to an institution or that she was to be detained there for any particular length of time. We must, therefore, come down to the final discussion of this case within extremely narrow limits. And we say this: That unless there is testimony in this case which establishes the false and fraudulent character of these certificates as against these physicians, there cannot be any recovery against them, if this is all of the plaintiff's case, and if this is the conclusion of the plaintiff's case. Nowhere, that the court knows of, is the certificate of a physician presumed to be false until it is proven to be true, and there is not anywhere any presumption that a person incarcerated in an institution

is sane, so that the detention in the institution has to be justified by the proof of insanity before there is testimony on the other hand. The existing condition of affairs, provided it is justified by law, is presumed to be the correct condition of affairs, or the proper condition of affairs, until the contrary is shown.

Now, there is no testimony at all as to the mental condition of this plaintiff at the particular moment of time when she was produced, as she was produced, and as she admits she was produced, before each and both of these physicians. I should hesitate very much to say anything or do anything that would induce any physician to view lightly or treat without consideration, the subject of the issuing of a permit, or the issuing of a certificate, which is intended to deprive a man or a woman of his or her liberty. I know nothing that is more important, or that is dearer to a human being, than his or her liberty. But, on the other hand, I should almost as much hesitate to say to a physician that you must, whenever you are called upon to do a thing, be certain that you can guarantee success before you make the effort, because that, practically, would deprive humanity of the opportunity of enjoying the skill of physicians who would, under those circumstances, refrain from the exercise of their skill unless they could guarantee a cure. We all know that there are many instances when people ought to be put away, and when the opportunities of discovering the fact as to whether or not they ought to be put away are no more abundant than they were in this case, and it would be in a great many instances a very sad condition of affairs if physicians should refuse to give certificates because they were not sure that when they were brought into court for the purpose of giving some justification of those certificates, they would succeed in justifying the giving of them. And, as I said before, there is a certain presumption in favor of the validity and of the correctness of certificates that are given under these circumstances by physicians who are reputable, and who are known, and who have, to say the least, the usual and ordinary skill which attaches to men of their profession and to practitioners who have been as long in the practice of medicine as these defendants have been.

So that there should be something in this case to have established positively, and not simply by a negative inference; there ought to be something in this case to have established positively the fact that at the particular time when these particular certificates were issued, these doctors knew or had some good reason to believe, they were doing a false or fraudulent act.

Now, on the other hand, the testimony of Dr. Rennolds—properly in this case, unless the court was wrong in the ruling it made at that point—the testimony of Dr. Rennolds established a condition of affairs, which, to say the least, whether it justified a commitment or not—and the Court is not going to express any opinion on that subject—certainly went to the extent of negativing any reasonable inference which this jury could draw

from that testimony that the doctor had been negligent in his diagnosis, or having made a diagnosis, had falsely and fraudulently misrepresented it.

So that whether it is related to the first count of the declaration as a matter of conspiracy, or whether it is related to the second count of the declaration, and I must confess that when you analyze the two of them and bring them down to their final essence there is not, after all, a great deal of difference between the two counts—but whether you refer it to one count or the other in the declaration, I cannot see that there is any testimony in this case that would justify this jury in saying, under the circumstances which the doctor found in the presence of the plaintiff, with an opportunity of noting her actions and conduct, supported by what he had seen with his own eyes and independent entirely of what he had heard from others, but what he had seen with own eyes some days before, I cannot see any grounds for any reasonable conclusion on the part of this jury that the doctor falsely and fraudulently and deliberately misrepresented this case, or misrepresented the condition of the plaintiff for the purpose and with the object of depriving her of her liberty.

* * * * * * * * * *

The answer which the court gives, and the answer which it has undertaken to give the reasons for in the remarks I have just been addressing to you, is this: That there is no testimony in this case, legally sufficient, which would justify this jury in finding a verdict for the plaintiff as against these defendants, on the testimony which has already been offered in the case by the plaintiff, which, of course, is now concluded. And, therefore, the action of the court will be to grant the prayer, and instruct the jury that, under the instructions of the court, they must find a verdict in favor of the defendants.

It will be seen that this opinion, while it in no degree tends to lessen the responsibility imposed upon physicians in making certificates of insanity, is practically in line with the leading opinions in mal-practice cases—that a physician is bound to exercise only that ordinary degree of skill and knowledge naturally expected from those who practice medicine, and that it further lays down the rule, that, having in the examination of the patient concerning whom certificates of insanity are made by them exercised that ordinary knowledge and due care, the certifying physicians are not responsible for any results which follow the use of such certificates, in securing, under the regulations fixed by law, the commitment and detention of the person to whom they relate in an institution for the insane.

Certifying physicians must, therefore, be able to show that they possess the usual and ordinary skill of those engaged in the

practice of medicine, that they have exercised that skill in the examination of the case in question; and that that which they saw, or the evidence which they obtained in the course of their examination of the patient, independent of anything learned from or told them by others, was sufficient to satisfy them as to the correctness of their diagnosis of insanity, and the justification of certificates to that effect.

The learned Judge makes it clear that infallibility is not expected; at the same time, he is at some pains to point out the grave responsibility involved in making certificates of insanity, and the necessity for the exercise not only of all the diagnostic skill possessed by the examiner, but of a thoughtful consideration of the nature of the act in question, and naturally of the consequences which may follow the making of a certificate of insanity. At the same time the Judge, in his opinion, makes it clear that possessing the qualifications and having complied with all that the law demands of those who practice medicine or surgery in the examination of persons alleged to be insane, physicians cannot be held liable for the consequences which follow the use of certificates they may make and sign under such circumstances.

Pellagra and Pellagrous Insanity in the United States. —Shortly after the publication of the report to the South Carolina State Board of Health, upon Pellagra and Pellagrous Insanity in the American Journal of Insanity for April, 1908, Dr. J. W. Babcock, Medical Superintendent of the State Hospital for the Insane, Columbia, S. C., who was largely responsible for the report, and who has devoted much time and study to the subject, went to Europe to make further investigations and to compare the cases of Pellagra to be seen in Italy and elsewhere in southern Europe and in Egypt with the suspected cases observed in this country.

Dr. Babcock has just returned and in a letter received from him from London just before sailing for home he says: "I have fully satisfied myself as to the identity of Pellagra as it exists in the Southern States and in Italy and Egypt. I studied many cases near Venice and Milan; and in London, Dr. Sandwith has been especially kind in reviewing the whole subject with me at the London School of Tropical Medicine."

Dr. Babcock is to be congratulated, not only upon the opportunities he has had of following up, in localities where Pellagra is not only well known, but scientifically studied, the observations made in this country, and recorded in the report to which we have referred, but upon the confirmation of the conclusions which he had practically drawn from his studies.

We trust then, as the JOURNAL had the honor of publishing his preliminary studies and the report thereon, it will also be the medium through which the results of his European investigations, as well as those which we understand he is now conducting, will be given to the profession.

EXTRAORDINARY LONGEVITY IN AN INSANE WOMAN.—The death of an aged patient in a hospital for the insane is not usually an event of sufficient importance to call for comment. Samuel Johnson's ideal was

> An age that melts in unperciev'd decay
> And glides in modest innocence away;

but when there appears to have been a reversal of the Darwinian law and an "unfit" person has survived as a bit of mental wreckage after sixty-five years of residence in a State asylum, the event compels reflection on the significance of longevity so extraordinary.

The New York State Lunatic Asylum at Utica (now Utica State Hospital) was opened on January 16, 1843. Margaret Cahoon, who died on August 24, 1908, at the age of ninety-nine, was admitted to its wards as a patient on August 29, 1843. She had been transferred thither from the Hartford Retreat, Connecticut, where she had been a patient since 1841. She had therefore been under continuous confinement as a helpless and irresponsible person for sixty-seven years. At the time of her admission the patient was described as "demented and unappreciative," without ability to engage in coherent conversation, and she "appeared to have but little realization of what was going on about her." Margaret Cahoon must have been known to many generations of psychiatrists throughout the United States who served their apprenticeship at Utica, as a confirmed dement who was dragging her useless body with infinite slowness to the grave. Had she had the mentality to observe it, her record of what had

been accomplished in the world's work since she entered the Hartford Retreat in 1841 would have formed an interesting and instructive chapter. It is hard to believe, for instance, that when she travelled to Utica from Hartford the New York Central Railroad was not in operation. The journey must have been made largely by water, the last part of it on one of the packets which ran on the Erie Canal. And if one stops to think of the changes which have taken place in the administration of the Utica State Hospital and the care of the insane within that long period, one cannot avoid the pleasing conclusion that great length of days in this instance must have been the result of continuous and progressive humane care. And yet how many newspapers, one wonders, have pointed to this moral in commenting upon the much advertised event? Unfortunately, the sensational press, with its eye and ear at every key-hole, is ever ready to make the most of the exceptional case of ill treatment, while the rule of enlightened and humane care—and we are sure it is the rule in the larger State institutions such as that in which Margaret Cahoon dragged out her hapless existence and never realized in her experience, poor creature, that "life protracted is protracted woe"—receives scant if any recognition under a distorted sense of news-values. We are the more moved to this comment at this time because only a few weeks ago even so eminently respectable a newspaper as the *Evening Post,* in discussing the increasing burden of insanity and mentioning as one of its causes the obvious accumulation of the insane, said:

> Back in the eighties a man had to fancy himself the North Pole or cleave a neighbor's skull in order to secure a ticket of admission to a padded cell. To-day the absent-mindedness of a paying teller, acute hysteria or the emotional insanity of a drunken paramour suffices.

That paragraph surely was written by a man who must have been born not earlier than "back in the eighties." Has anybody ever seen a padded cell in the United States? Personally we know of no institution in this country in which such an anachronism exists. Indeed, back in the forties in the first annual report of the State Lunatic Asylum at Utica, written during the year of her admission thereto, Dr. Brigham says:

> Many of the violent class are brought to us in chains or with their limbs confined by strong cords. These are in all cases immediately removed and

the patient is kindly addressed and assured that he is among friends who will use him well. He is then taken to the apartment which he is to occupy and permitted to have his liberty; but his attendants are directed to watch him carefully and if he is disposed to be violent, to strike, to break windows or the furniture, to put him in his room. We adopt very few methods of restraint even with the most violent patients, never in any case use ropes or chains and dispense entirely with strait jackets. We occasionally have a patient who will exhaust himself by excessive activity, that we fasten in a gentle manner to a chair or a bed for a short time, but none of these methods of restraint are long continued. We much prefer that a patient should occasionally break a pane of glass or tear some of his clothing, than to keep him constantly confined. . . . . For the most part those who are brought here in a very excited state and require the foregoing treatment, when they recover feel grateful for the attention bestowed upon them when in this condition, and are sensible that they were kindly treated, and not only so, but appear to realize that by the course pursued their lives were saved. They also lament the trouble they occasioned those who had the care of them.

Let those of us who are prone to flatter ourselves that all advances in psychiatry have been made within our own generation ponder the foregoing paragraph and realize in estimating the causes which may have contributed to the longevity of the patient under consideration that during all those long years her ears were not unused to "the still, sad music of humanity."

Book Reviews.

State of New York: State Commission in Lunacy. Nineteenth Annual Report, October 1, 1906, to September 30, 1907. Transmitted to the legislature January 31, 1908. (Albany: J. B. Lyon Company, State Printers, 1908.)

This volume of more than 1300 pages contains much statistical material, profitable, doubtless, to the members of the legislature, whose duty it is to perfect the necessary legislation for the proper management and maintenance of the institutions controlled by the Lunacy Commission, but of local, rather than general, interest. The formal report of the commission, with accompanying documents, however, contains much which every person engaged in the medical care of the insane may read with profit. We learn that the recovery rate shows a slight increase over that for 1906, that the capacity of institutions for the insane in New York has been increased 621 beds during the year, that through the vigilance of the State Board of Alienists 352 insane aliens have been deported and 170 non-resident patients have been sent to the States where they have a legal residence, that the entire disbursements for the care, oversight, and support of the insane during the year were $5,927,531.37, and that the number of the dependent insane in institutions on October 1, 1907, was 27,162 persons.

In the proceedings of the quarterly medical conferences attended by representatives from the hospitals and members of the Lunacy Commission one is impressed with the development of the present spirit of scientific effort as compared with the administrative zeal which formerly gave tone to them. Instead of discussions upon soap, on the proper roasting of coffee and grinding of pepper, on the size and style of paper and envelopes, on the use of the safety razor, on the vacuum-cleaning of clothing and similar necessary, but unimportant matters for the consideration of expert alienists, we find papers and discussions on the training of nurses and their hours of duty, on the admission of dotards to the hospitals, on the best statistical tables for the annual report, on the occupation and diversion of patients, on open-air treatment in psychiatry, and on the care of the insane prior to commitment. The discussions seem pithy and practical, and display a knowledge of the subjects under consideration and a refreshing habit of viewing all hospital questions from the standpoint of the physician. The discussion which followed the report of the director of the State Pathological Institute is a case in point. It shows plainly a wide sympathy with the aims of the institute and a hearty spirit of co-operation.

It is most gratifying to read such an expression of opinion as the following from Doctor Pilgrim, of the Hudson River State Hospital: "I am sure that there is not a superintendent in the State who will not agree with me when I say that the medical work is being done in a way in which it was never done before. I have been in the service for 25 years and I can state without the slightest qualification that the work of the medical men has never been as well done as it is being done at the present time, and I think that the lion's share of the credit for this work is due to Doctor Meyer and the methods that he has advocated; and I should be very sorry indeed to see him depart from any of the ideals he has set up." It is also evident from the discussion which followed that the Lunacy Commission is in substantial sympathy with all scientific work even if the queries of Commissioner Parkhurst were pointed and well-nigh personal.

One must conclude, after a careful reading of this report, that the condition of the dependent insane in New York is better than ever before and is most creditable to the medical officers of the hospitals of the State and to the labors of present and former commissioners in lunacy.

Psychiatrie für Ärzte und Studierende bearbeitet. By Dr. Th. Ziehen, Professor in the University of Berlin. Third revised edition. 801 pages. (Leipzig: S. Hirzel, 1908.)

Ziehen's text-book has made for itself a place among the classics in psychiatry. The first edition appeared in 1894, the second in 1902, and the present edition, 50 pages thicker than the preceding, was published in December, 1907.

Ziehen's work is based upon the well-known association doctrine, which, whether or not one's personal bias allows him to accept it, cannot at least be disproven. According to this view, "there exist but two psychic elements, namely, Sensations (*Empfindungen*) and Perceptions (*Vorstellungen*). The only factor which collaborates with these is the Association of Ideas (*Ideenassociation*). The product of this process is an Act (*Handlung*). The so-called spiritual faculties which the earlier speculative psychology distinguished, do not exist. Particularly is the assumption of a special faculty of Will, which shall hover over the association processes and determine 'voluntarily' this or that movement, superfluous and misleading. Equally superfluous is the assumption, still shared by many, of a special Apperception which shall voluntarily turn its 'attention' now to this, now to that perception or sensation, and in this manner determine the course of the association of ideas. Perceptions succeed each other, on the contrary, according to fixed laws, without the intervention of any special voluntary shunting factor; and the resulting movement is likewise the *necessary* product of this association of ideas. Finally, there exists also no separate faculty of feeling. Careful investigation shows rather that our feelings of pleasure and pain are never isolated, but occur invariably bound up with sensations and perceptions; in other words, as qualities of these."

Mental diseases Ziehen divides into two great groups: (1) Psychoses without intelligence-defect; (2) Defect psychoses. The latter include all forms of congenital weak-mindedness and acquired dementia and correspond essentially with the so-called organic disorders. By intelligence-defect Ziehen understands a weakness of memory and judgment. The other, larger group corresponds with the functional psychoses and includes the primary affect disturbances (mania, melancholia, circular insanity, etc.); all conditions of transitory mental confusion or clouding (*Stupiditat, Dämmerzustände, Deliria*); together with paranoia, obsessional insanity, and the constitutional psychopathies.

Ziehen, while recognising the close relationship between mania and melancholia and the tendency of the affect psychoses to a recurrent or circular course, objects to Kraepelin's universal category, maniaco-depressive insanity (inconsequent neologism, mania, *disease;* depression, *symptom*), on the ground that it does not do justice to the cases of simple mania and simple melancholia. From the clinical descriptions, however, one finds little support for the objection. For example, simple mania is described with regular pro- and epidromal stages of depression, the former lasting from three to eight weeks, and the latter sometimes increasing to the degree of a real melancholia. Also, during the excitement, intercurrent depressive phases are occasionally observed, such cases usually, "not always," turning out to be periodic or circular psychoses. Ziehen gives no indications by which these various conditions may be distinguished clinically before their course has become established under observation.

In the present edition is inserted, in the chapter on mania and melancholia, a section on "protracted affect variations" and "eknoia." The former "usually follow an acute, less often a peracute affect shock, and in the simplest cases present only a pathologically increased and prolonged affect reaction, of the character of the etiologically active affect." Associational retardation or acceleration (as in melancholia or mania) is not conspicuous, and the whole process does not give the impression of a "circumscribed" psychosis. These protracted *Affektschwankungen* are most commonly observed in the congenital defect states (*Debilität*) and in the constitutional psychopathies. Certain affect variations occurring in otherwise normal individuals during puberty and the senium, as well as accompanying menstruation, pregnancy, and the climacteric, are placed under the same head. The morbid state may last a few hours or several days or weeks. This description covers obviously the mildest forms of affect depression or exaltation, cases which frequently come to the notice of the general practitioner, but are seldom observed in institutions.

To the present reviewer, Ziehen's characterisation of "eknoia" does not seem entirely clear. It is said to occur particularly in persons hereditarily burdened or suffering from exhaustion, and as an outgrowth of the affect variations just described. The affect change is primary, but is soon accompanied by hallucinations and delusions, and in severe cases a condition results, "which entirely resembles that of amentia." The commonest

affect variation said to underlie eknoia is morbid enthusiasm (*Ergriffenheit*); for example, excessive political or religious zeal. The distinguishing feature of eknoia as against amentia seems to be the order of sequence of symptoms, a definite affect excitation preceding the fallacious sense perceptions and the insane ideas and incoherence of eknoia; while in amentia (*paranoia acuta hallucinatoria*—Ziehen), "even though precipitated in exceptional cases by an affect shock," delusions, hallucinations, even incoherence appear at once, and the affect disturbances represent only the natural accompanying signs. The prognosis of eknoia is as uncertain as its clinical outlines. "The rapidly increasing excitement may lead to the picture of *delirium acutum* with fatal ending. In other cases it takes a chronic course apparently with no defect. Probably not over 50 per cent of the cases get entirely well."

The present edition of Ziehen's work shows an improvement and a tendency to simplification, in condensing the chapter on the so-called combined psychoses; and making exception possibly for the permanent cylic cases such as described by Falret and Baillarger, there is no patent reason why the chapter should not be suppressed altogether. Quite analogous to the separate discussion of "periodic mania," "periodic melancholia," etc., would be the clinical distinction, *e. g.*, between "simple" influenza and "recurrent" influenza, on the ground that in the latter case the patient had during his life two or more attacks, while in the former he was ill but once.

But the tendency to simplification has not gone very far in Ziehen's clinique, and in general his consideration of disease-states follows an opposite direction to the "clinical" course of Kraepelin. Both are in a sense extremists. Kraepelin throws together under a single head many symptomatologic states, and assigns to a single disease-process mental attacks which may have been divided by a long period of years. Ziehen gives a separate name, even a separate description, not only to recurring intermittent phases of diseases, but also to successive symptom-pictures in a circumscribed continuous morbid process. Thus, we find, in his text-book, "secondary postmaniacal paranoia," "secondary stupidity (*Stupidität*) following amentia," "postneurasthenic melancholia," etc.

Ziehen's work would unquestionably be less satisfactory than Kraepelin's as a book for beginners in psychiatry. For advanced readers, however, it furnishes a unique and instructive viewpoint in psychopathology.

FARRAR.

Index of 1180 Postmortems of the Insane, State Hospital for the Insane, Norristown, Pa. By H. J. SOMMER, JR., M. D., Pathologist; formerly Assistant Physician of the institution. With an introduction by ALLEN J. SMITH, A. M., M. D., Professor of Pathology, University of Pennsylvania; Consulting Pathologist of the Hospital. (Published and distributed by authority of the Board of Trustees, 1908.)

This volume of 316 octavo pages from the printing office of the Norristown State Hospital is a lasting memorial to the patient industry of the

author. To take scattered and disjointed notes left as an incubus upon the laboratory by less industrious or conscientious workers and to use them as a foundation and model for the future work of the laboratory is most praiseworthy. The work is divided into three parts, Part I being a general index of autopsies; Part II being a cross index, showing clinical types of insanity, sex of clinical cases, color of clinical cases, anatomical lesions, such as brain, spinal cord, meninges, etc.; and Part III being an index of museum specimens. We gather from the introduction that the autopsies varied much in completeness, both of clinical and pathological record, and that many of the latter, perhaps the majority, gave little more than a record of the gross or apparent brain lesions, and generally a simple anatomical diagnosis. These lesions seem also to have been insufficiently described. The author says, "Great difficulty was experienced in interpreting the meaning of many of the descriptions of lesions of organs, and at times it was necessary to guess at the diagnosis. Many descriptions were incomplete, here and there a short note being found, but in the main the descriptions were fairly complete." Doubtless many other pathological laboratories would give a similar report if called upon unexpectedly. The waste of effort in this direction during the past 20 years in institutions attempting pathology is melancholy. If this volume could stimulate laboratories in connection with institutions for the insane to do their pathological work promptly and to record it clearly and fully by a uniform system of records, it would prove of great value to all. An examination of this book compels one to accept the conclusion of Doctor Smith "that without such detailed effort all the time given in years past to the doing of autopsies and to their recording [at Norristown] would be practically lost." It is gratifying to know that a new era in pathology there has been inaugurated by Dr. Sommer.

Half-Yearly Summary.

CALIFORNIA.—*Southern California State Hospital, Patton.*—At the special meeting of the board of managers held on March 16, 1908, a contract was let for the building of a storm ditch through the grounds of the hospital. This ditch is for the purpose of protecting the ranch from the effects of storm water which descends from the mountains back of the institution in great volumes at times. The ditch is more of an engineering feat than appears from the word. The fall from the beginning of the ditch to where it empties into the county ditch is more than 6 per cent, but by a series of cushions, or, as they appear to the layman, water-falls and catch-pits, the grade is reduced to less than 3 per cent. The present contract covers only about one-third of the length of the ditch. The coming legislature will be asked for money to build the second third next year.

At this same meeting bids were also opened for the erection of a new dairy building and also for replacing the old tin roofs on the buildings by modern slate ones, but all of the bids exceeded the appropriations so that all bids were rejected, and it is necessary to again advertise for bids.

At the meeting of the board held on April 7, the secretary was instructed to advertise for bids for the erection of the new receiving cottage, an appropriation of $43,000 for which was granted by the last legislature. This building will be of re-enforced concrete, one story high, except in the center, and will provide accommodations for 60 patients, 30 males, and 30 females. These wards will be built with special attention to relieve them from all institutional or hospital appearance.

The rooms will be larger than those in hospitals for the insane in general. There will be a good-sized day-room in each building, an extra diet kitchen, a dining-room with small tables to accommodate about four patients at each, and the furnishings and decorations are to be attractive and of excellent quality.

Between the two wings which contain the receiving wards there will be erected a two-story structure, on the first floor of which will be a hydriatic institute, in which all apparatus necessary for the application of water will be installed, and accommodations will also be had for a number of pack rooms, massage rooms, and other forms of treatment of heat, water, and personal manipulation. In this building the photographic studio will also be placed so that patients can be photographed before being taken to the wards. There will also be rooms for three nurses and an office for the assistant physician in charge of the building.

In the second story of the center building there will be a suite of rooms for the first assistant physician, also accommodations for the matron and

two nurses. The building will be erected about 300 feet southwest of the present main building. The site is a beautiful one and the outlook is very fine.

—*Agnews State Hospital, Agnew.*—The rebuilding of this hospital is going forward. Four buildings are practically completed, six others are under construction and four more have been contracted for. The construction is reinforced concrete. Patients are still being cared for comfortably and successfully in temporary buildings. The health of the patients has been excellent and the mortality remarkably low.

—*Mendocino State Hospital, Talmage.*—There has just been completed a cottage for convalescent female patients, and a cottage for male patients is now being constructed.

A hydrotherapeutic plant has also been installed and is in use.

COLORADO.—*Colorado State Insane Asylum, Pueblo.*—The new wing for women patients has been completed and is occupied by about 50 patients from the Arapahoe County Hospital and by about 50 cases from other parts of the State. While this in a measure relieves the overcrowding, further provision must soon be made to provide adequate accommodations for the State patients. The present population is now about 900.

DISTRICT OF COLUMBIA.—*Government Hospital for the Insane, Washington.*—During the past year a number of improvements have been made at the hospital, only the most important of which will be mentioned. The East Lodge building has been entirely remodeled for a home for male nurses. The dormitories have been cut up into small rooms, and a large assembly room has been provided downstairs where there was formerly a dining room. The building was admirably adapted for this remodeling, and will accommodate about 50 nurses. It will be opened for occupancy sometime in September. A large steam sterilizer 30 inches in diameter and 70 inches in length has been installed in the laundry. A great deal of the antiquated plumbing in the old main building has been torn out and modern plumbing installed, with exposed piping. The toilet rooms where this plumbing has been changed have also been remodeled entirely with tile floors and slate partitions substituted for old wooden ones. The work of fireproofing has been finished by completing the installation of some 15 fireproof stairways and 185 fireproof doors. A modern Metropolitan, fifth size, fire engine, with a pumping capacity of 400 gallons per minute has been purchased to replace the old engine which was worn out. The remodeling of the center of the old main building has been proceeding slowly. Up to the present time a recitation room for nurses has been completed, containing seating capacity for 32 students, and is provided with tablet-arm chairs and blackboards. Another room has been set aside and equipped for the use of the dentist, while the superintendent's old office is in use as

an ophthalmological department, the closet adjoining making an excellent dark room. In addition to the above a circulating library for patients has been installed containing at present approximately 3000 volumes; published catalogues are distributed to the wards, and the usefulness of the library is attested by the fact that something like 400 volumes are in constant circulation. The amusement hall provided for at the last session of Congress is now in process of erection. It will be built on the theater plan with a seating capacity of a little over 1000. It occupies one end of the Administration group quadrangle, opposite the nurses' home, and completes, architecturally, this portion of the grounds. It is a thoroughly fireproof building, with a balcony for visitors, and will be used for theatricals, dances, balls, etc.

The last session of the training school graduated 17 nurses, 5 men, and 12 women; while this is about the usual number it is hardly sufficient to supply the needs of the hospital, as is shown by the fact that while practically every graduate of the training school is in charge of a ward, still at the close of the year only 43 out of the 86 wards of the hospital were in charge of trained nurses. Last year two of the four wards of the male infirmary were put in charge of women. This experiment has proved so satisfactory that the other two wards of this building have been similarly treated, and plans are being made to further place women nurses upon male wards.

A new appointment is that of Dr. Nicholas Achucarro, of Bilbao, Spain, as histopathologist. Dr. Achucarro comes to the hospital for a year to organize a histopathological research department, and brings to it a high degree of efficiency which he has gained from his studies in the laboratories abroad. He studied under Professor Pierre Marie, of Paris, Professor Kraepelin, and Alzheimer of Munich, and Professors Tanzi and Lugaro, of Florence. He has made numerous contributions to scientific literature, and the hospital considers itself fortunate in securing his services.

ILLINOIS.—*Illinois Eastern Hospital for the Insane, Hospital.*—The inauguration of the State Psychopathic Institute at this hospital marks a change in existing methods of State care of the insane. It is intended that one or two of the assistant physicians from the eight State institutions shall attend a course of preliminary instruction which the director, Dr. H. Douglas Singer, will give in reference to the new system of examination and record-keeping. After this instruction has been given, Dr. Singer will visit each institution and spend about a week at each, personally inspecting the work that is being done and making suggestions toward securing uniformity. Following this, a regular course, including laboratory work, will be given at the institute. It is intended to do research and pathological work as well as clinical investigation at the institute.

MAINE.—*Maine Insane Hospital, Augusta.*—The reconstruction of the first wing for male patients which had been mentioned in the April num-

ber of this JOURNAL has been completed. The reconstruction is entirely fire-proof, and the second and third stories of the wing are for the care of all the new admissions and acute cases who are to be domiciled there until such time as is consumed in diagnosing each individual case, when they will be classified by removal to other wards of the institution. Each ward is supplied with two bath-rooms, one of which is devoted to the continuous bath treatment under the immediate care of trained nurses, and a sufficient corps of attendants. The lower ward of the building is occupied by a quiet class of helpless old men. With the arrangement in the construction of this wing, it offers an opportunity in strengthening treatment of the patients and facilitates diagnosis.

The hospital wing being constructed for the criminal insane and which has been mentioned in a prior issue is fast nearing completion. It is located some distance from the main building upon a site which will offer to this class, an opportunity of open-air exercise without mingling with the other patients of the hospital. When ready for occupation, the criminal insane will all be removed from the State prison and placed under the management of this hospital. Much has been accomplished during the season in repairing the road approaches, and a new one is being constructed, which will lessen the distance to the city very materially, and offer a better grade. It is now being macadamized. A pleasure ground has been laid out upon the premises for the females of the institution, a pavilion constructed, water introduced, and other appliances arranged for their comfort. This plat has a large number of native oaks which will offer much comfort to the patients. From this park there is a beautiful prospect of the river, the city, and the hills beyond. Playgrounds are being planned and the environments will be such as will extend comfort and proper recreation for the patients.

—*Eastern Maine Insane Hospital, Bangor.*—A new wing, accommodating 150 female patients, has been completed this summer. The building is of fire-proof concrete construction. Dormitory beds will greatly outnumber single rooms, which have been reduced to the minimum.

A building for tuberculous insane, provided to care for suitable cases from the hospitals here and at Augusta has been erected on these grounds, which will accommodate 40 patients. The building is one story, brick construction, with windows arranged to give a maximum of light and air, and has an enclosed veranda with southern exposure, running the whole length of the building. It will practically be conducted as a separate hospital unit devoted to the special care of the tuberculous insane.

In January, 1910, the State assumes the support of the insane, and further construction will be required during the coming year in anticipation of the numbers that will be transferred from poor-farms in the various towns.

During the past year the medical work has been stimulated by regular staff-meetings at which all new patients are presented with a carefully prepared case history.

Provisions have been made in the new wing for laboratory space, and this branch of medical work will be inaugurated at the earliest possible date.

MARYLAND.—*The Sheppard and Enoch Pratt Hospital.*—The new dining room and kitchen block, description of which appeared in the JOURNAL for October, 1907, has been in use since June 1 last, and has proved a very valuable addition to the facilities of the hospital.

On September 1 a young lady trained in arts and crafts was employed to direct the occupation and recreation of the patients. Classes have been formed in leather and metal work, in weaving and basket work, and in various artistic occupations suitable to patients. As interest increases and experience in the best forms of occupation is gained, these various employments will be modified and their number increased.

State Care of the Insane.

At the last session of the State legislature the act committing the State to the care of the dependent insane after 1909 was repealed and re-enacted so as to extend the time when the State would inaugurate "State care" until 1911. This was necessary because of the fact that no plans had been formulated for the care of the insane under State control, nor had any appropriation been made for meeting the expense of such care, or for erecting the necessary buildings.

The act includes a clause directing the governor and State Lunacy Commission to prepare plans for carrying out the provisions thereof and present the same at the next session of the State Legislature in 1910.

Changes in the State Lunacy Commission.

Drs. Henry M. Hurd, Hugh Young, and Robert M. Black have been appointed members of the State Lunacy Commission to fill vacancies caused by resignations or expirations of terms of office. Dr. Arthur P. Herring has been made secretary of the commission to succeed Dr. George J. Preston, deceased.

MASSACHUSETTS.—*State Asylum for Insane Criminals.*—There were 612 patients here September 1, 1908, which is an increase of 51 over the number cared for one year ago.

During the present summer about seven acres of garden has been cultivated and about 60 patients have been regularly employed cultivating this garden and grading the land enclosed for the employment of patients who could not safely be worked outside of an enclosure. Fair returns of green peas, corn, tomatoes, string beans, and melons have been secured. Over 5000 strawberry plants were set out, from which returns are expected next year.

The new industrial building is about completed and is expected to be ready for use by early winter. Because of the difficulty in finding employ-

ment for men who are physically fit it has been planned to have the asylum washing done by hand, using the tub and scrub-board, familiar to housewives years ago.

The entire upper floor of "H" Building has been used for a hospital and infirmary, with a special diet kitchen and small operating room, the diet kitchen being under the charge of a trained woman nurse. The south end of this hospital floor has been specially constructed as a ward for 12 tuberculous patients, whose beds may be rolled on the porch where they remain day and night when the weather is not too severe; the beds being rolled into the moderately warmed ward when sheets need to be changed. Provision for an increase of patients must be made during the coming year.

MICHIGAN.—*Michigan Asylum for Insane, Kalamazoo.*—The Van Deusen Hospital has been finished and is now occupied. This building will easily accommodate the 104 patients specified in the legislative enactment. In design and equipment, it is well adapted to its purpose, that of a receiving ward for women.

Hall L, one of the two new wards at the male department, gained by raising the roofs over the extremities of the wings was opened for patients in April. The corresponding hall M can be finished at short notice whenever additional room is required. Each of these wards is made up largely of a sitting room and dormitory. They prove to be very convenient and pleasant additions to the department and afford comfortable quarters for 40 patients each. This, in a measure, remedies the original defect of the building in lacking dormitory space and enables certain epileptics and general paralytics who need to be under constant observation to be assembled. This is one step in the segregation of epileptics which has lately been undertaken.

A new continuous bath room was opened in the basement of Edwards Hospital, the receiving ward for men during the year. It practically constitutes an additional ward for disturbed patients and has a capacity of four tubs and ten beds.

Seven new porches contribute greatly to the comfort of the patients. Some other important improvements are well under way and when completed will give the asylum a capacity of 2100 patients.

It is a constant regret to the medical staff that there is no suitable laboratory, autopsy room or morgue. This is an imperative demand of scientific advancement, and it is earnestly hoped that the next legislature will take the same view of the situation. Considering facilities, however, the amount of laboratory work accomplished has been creditable. In a general way it has included the examination of urine, blood, sputum, spinal fluid, stomach contents, stools, various inflammatory exudates and the gross and microscopical specimens obtained from autopsies of which there were 28.

The therapeutic value of healthy occupation for a very large per cent of the insane has not been lost sight of and at the present time there are thus employed, exclusive of bed patients, 53 per cent of the inmates.

MISSOURI.—*State Hospital No. 2, St. Joseph.*—This hospital was struck by lightning the morning of June 10, 1908, and a slight fire followed, which was controlled by the physicians and attendants.

NEW YORK.—*Binghamton State Hospital, Binghamton.*—During the past six months nothing more important has been done at this hospital than the establishment of the Convalescent Camp as a part of the farm colony. The camp has an ideal location on a fine terrace along the Susquehanna river about four miles east of the city of Binghamton. Great pine and elm trees shelter it from the summer sun, and a broad stretch of moderately deep water affords ample facilities for boating, fishing, and bathing. The camp is designed as a part of the treatment of convalescent patients and is a step in advance of existing methods, for it embodies the idea of personal freedom and outdoor life in its most perfect conception, and promises most excellent results in the direction of cure. The camp consists of seven tents and a small frame structure used as a kitchen. Two large tents are used for patients' dormitories, and several smaller tents are occupied by patients and their attendants. One tent is specially arranged for the trained nurse who has charge of the camp, and within it is placed a telephone for direct communication with the medical office in the hospital, a convenience which enables the physicians to keep in constant touch with the camp. In addition to this telephone service one or more of the physicians on the hospital staff visit the camp every day.

The camp kitchen is a small frame shack with a brick range and oven, and alongside of it is the dining tent which seats 25 persons. Hammocks, swings, settees, boats, music, and a library of reading matter complete the camp equipment.

In the evening a huge camp fire is kept burning on a pile of rocks at the water's edge, and clouds of glowing sparks rising high in the air add to the attractiveness of the scene. The camp has been occupied since early summer. It accommodates about 25 patients who remain about two weeks after which they return to the main hospital to make place for 25 others. In this way about 50 patients have enjoyed the advantages of the camp during each month. In many cases improvement has been noted in the condition of these patients almost immediately after their arrival at the camp. They have gained rapidly in weight and in many instances coincident mental improvement has been noted.

The nurses who have had charge of the camp have also enjoyed the outdoor life so much that volunteers for the camp service have been numerous. It is expected that the camp will be materially enlarged next summer by adding more tents for the accommodation of both patients and nurses and

by the provision of conveniences which will make it more comfortable in every respect.

During the past year the contractors have been completing the construction of the new acute hospital, Fairmount. This building occupies a splendid site near the main hospital and has been erected at a cost of about $100,000 for the accommodation of 100 patients. It has been designed for the care and treatment of acute cases of insanity with the aim in view of giving to these patients the best possible treatment that can be devised. A part of its special equipment consists of elaborate hydrotherapeutic apparatus and special appliances for prolonged baths. This building will be opened for patients in the near future.

A new nurses' home to be known as Ferris Hall is now in process of construction. This building will accommodate 150 persons, all of whom, except a few married persons, will have single rooms. The building is intended to provide residence accommodations for employees without kitchen or dining room service. Such a structure has long been needed for nurses and attendants who now are obliged to sleep in close proximity to the wards where at times it is well-nigh impossible for them to obtain the sleep and rest so necessary to their health and strength.

At the hospital power plant extensive improvements are being made. Old boilers have been discarded and the building housing them has been torn down to make room for a larger structure in which new boilers are to be installed this fall. With this new equipment it is expected that heat and power will be supplied more economically than heretofore.

In connection with the large building, Broadmoor, opened last year for the accommodation of the chronic insane, a new kitchen and dining room building is now being erected. The addition will be completed in November, and Broadmoor will then be available to its full capacity of about 700 patients. The hospital now has 2083 patients.

—*Buffalo State Hospital, Buffalo.*—Beginning in June of this year, the Buffalo State Hospital inaugurated a summer home for its convalescent patients which has been eminently successful in its results. A large private house, containing sleeping accommodations for 20, located on a little farm of 34 acres on the shore of Lake Ontario, and in the outskirts of a very attractive little village, was secured. About 16 patients are sent at one time for a two weeks' stay. A man and his wife, both graduates of the training school, are in charge of the home, and a nurse, who is more directly concerned in the care, amusements, recreations, etc., of the patients, accompanies the party, while a cook is employed in the kitchen.

Acute cases, during convalescence, have been sent there, as well as many patients, whose illness has been of some duration, and whose convalescence seems to have come to a standstill. In addition, some patients are sent, to whom it is a means of recreation, and in whom permanent recovery is not expected. The results have been extremely gratifying. Many patients made a quick convalescence and were able to go home soon after their

return to the institution. Most encouraging results have also been obtained in patients whose illness has been of several years' duration, and whose condition had become stationary. Many of these have been so much stimulated by the change, the home life, and the new interests and associations, that they have been enabled to go home also. Fishing from the pier, boating, bathing, walking, riding, and out-of-door games constitute the recreations, while many have busied themselves a portion of the time in the garden, orchard, or kitchen. In the two weeks which constitute the length of the stay, the individual patients have gained, almost without exception, from four to eight pounds in weight.

The cottage being only 30 miles from Buffalo, it has been possible to send down staples by rail twice a week very conveniently, while eggs, butter, milk, fruit, etc., are purchased in the neighborhood of the cottage.

The beneficent results of this plan have attracted considerable attention, and the superintendent has many requests from friends of patients that they be sent to the lake shore.

The board of managers has been much interested in the success of the experiment, and has a large collection of letters from enthusiastic patients, testifying to the great benefit as well as pleasure they have received.

It is hoped to continue the plan another year. It should be said that the idea was largely derived from the admirable farm colony inaugurated by Dr. E. H. Howard, superintendent of the Rochester State Hospital, Rochester, N. Y., on the lake shore, several years ago, although in their administration, the plans differ considerably.

—*Dannemora State Hospital.*—A new wing to accommodate 75 patients is nearly completed, and a new infirmary building for 60 patients has been commenced.

—*Gowanda State Homeopathic Hospital, Gowanda.*—At this hospital there is now being erected a cold storage and storeroom building at a cost of $25,000. Also a small building for tuberculous women patients, which will cost between $5000 and $10,000. During the summer 20 tuberculous cases have been cared for in a tent back of the buildings. A diet kitchen has been established during the past three months at which all the special diet for the institution is cooked. A house for the fire department is also being constructed, and during the past summer about 1½ miles of cement walk have been made.

—*Manhattan State Hospital, Ward's Island.*—The following improvements have been made during the past six months:

Wards 11 and 12 (formerly occupied by tuberculous patients who have been transferred to Camp Dent, the new pavilion erected for their accommodation) have been thoroughly overhauled and painted, and are now ready for occupancy. It is proposed to use Ward 11 for a neurological class of patients, and Ward 12 for an industrial class.

A new mangle and three washers have been installed in the laundry.

The flour storage building and alterations to the old bakery have been completed and new machinery installed.

Tile floors have been laid in toilet and bath sections of Wards 56, 57, and 58, East Building.

Wire screens for doors and windows have been installed in the nurses' home, men's homes, east and west, sewing room, linen room, tailor shop, smoking room, dining rooms, kitchens, center main building, east, and in Wards 22, 24, 26, 36, 56, and 59.

Cement sidewalks have been constructed from road (south end) to Ward 26 and around camps, also from main road to south end of nurses' home.

The cementing of the city dock is completed and cementing of coal dock now well under way.

A brick addition to the carpenter shop, 30 x 90 feet, is now being constructed, and the closing in and flooring of space, 18 x 142 feet for paint shop, is now under way.

A new hennery, 18 x 140 feet, has been constructed.

Money has been allowed for a tile floor and metal ceiling in the hydrotherapy room, Ward 36.

The heating system now being installed in the greenhouse is nearly completed.

An appropriation of $6000 has been made to furnish new beds for the hospital.

An appropriation has been allowed for the installation of a watchman's supervisory system. This will be accomplished as soon as possible.

Bathrooms have been constructed and equipped on second and third floors, main building center, for the use of assistant physicians.

Material has been allowed for repairs to roofs of pavilions and the work is well under way.

An important alteration to the building known as the Annex is now under way. The windows of the dining room are being cut lower, and an area-way is being built around the building so as to afford more light and better ventilation. Window screens have also been allowed for use in these windows.

Since the last summary was published the general health of the hospital has been excellent, with the exception that in the spring one male attendant and one male patient developed diphtheria, and one female attendant developed measles. These cases recovered. During the past few days several cases of typhoid fever have occurred in the men's division. One male attendant and four male patients developed this disease. This outbreak has been so far of rather serious character, showing a tendency to hemorrhage. Up to the present time there have been no cases of typhoid fever in the women's department. Measures to have all drinking water used thoroughly boiled and cooled are taken all over the hospital, and it is hoped that this precaution, and other necessary measures, that are usually taken, will prevent the further development of this trouble.

Training school work has already commenced for the coming session, and this department has the assistance of Miss Alice R. Townsend, of the Bellevue Training School for Nurses, who was recently appointed superintendent of the training school, under civil service rules, and she will devote her entire attention to this work.

The new tuberculosis camp mentioned in the previous summary has been occupied during the summer months, and has proven to be a great improvement over the old wards 11 and 12 for this class of patients. The dining room for those patients, who are able to go, is located a few yards from the camp, which is, by the way, known as Camp Dent, in memory of Dr. Emmet C. Dent, the former superintendent. During the fair weather those who are able to be outdoors sit under the trees, spending practically the entire day there.

An important addition to the medical staff of the hospital is the appointment of Dr. George H. Kirby as director of clinical psychiatry. Dr. Kirby for several years has been connected with the New York State Pathological Institute under the directorship of Dr. Adolf Meyer.

Owing to the large number of patients offered for admission to the hospital it has become so overcrowded that the State Commission in Lunacy arranged for the Central Islip State Hospital to receive on alternate weeks during a portion of the past six months. This has of course given considerable relief and enables the psychiatrical work to be done with more thoroughness. In April, 175 women were transferred to the Middletown State Hospital which gave some relief to the overcrowded condition of the hospital.

—*Rochester State Hospital, Rochester.*—A residence is being erected for the superintendent.

The old boiler-house, which is in the rear of the old group, is being changed into a kitchen. The former kitchen is being changed into a dining room.

Appropriations have been allowed for a mortuary, drug-room, laboratory, and a new barn at the lake farm.

Appropriations have also been made for painting the interior of the new group and for painting many portions of the old group.

—*Willard State Hospital, Willard.*—There has been no change in the general organization of the hospital during the last half-year. A building to accommodate 36 tubercular women is in process of construction. Two new engines and dynamos have been installed in the electric light plant. A new ambulance has been purchased. The appearance of the wards has been greatly improved by the addition of rugs and other furniture. The grounds have been improved by planting a number of trees, and considerable work has been done in repairing roads. An ice-making machine will soon be placed in the cold storage building. Many of the buildings have been painted during the summer.

—*Craig Colony, Sonyea.*—Among other work in progress at Sonyea in September last was the following: Two frame buildings for contagious diseases, one in the men's and one in the women's division, each with space for eight to ten persons. They are located near the infirmaries to make their administration less difficult than was the case with the old pavilion which was half a mile from the nearest residence. These cottages can be supplemented by tents, should more room be required. Each cost about $1800, including construction, heating, plumbing, and lighting.

Four cottages for employees to cost $1750 each. The colony now has 14 buildings like these occupied by heads of departments. They are very satisfactory in that they encourage home life in an isolated community. All have six rooms with a large cellar, bath, toilet, hot air heating, and are attractively built.

Two buildings for tubercular epileptics, of wood, each to accommodate 14 beds. Colony records indicate that tuberculosis is more common among epileptics than among the insane or in the community at large. They are to cost $15,000 each, including construction, plumbing, heating, and lighting.

An addition to the bakery to provide space for installing bread-making machinery that has long been required is in process of construction, and will cost $2000.

Fifty-five hundred dollars has been spent in laying 3200 feet of 4- and 6-inch cast iron water pipe for better fire protection for a dozen buildings occupied by officers and employees. A chemical engine, hook and ladder have been placed in the new fire house which was built last year at a cost of $6000, and which is well located in the geographic center of the residence portion of the colony. This part of the colony embraces about 500 acres; the entire acreage of the place is 1900.

Approximately three-quarters of a mile of cement walk, most of it 4, but some 8, feet wide, has been completed. An immense amount of grading has been done on the village green, about the Pennsylvania Railroad station, and in the women's group.

The county highway which crosses the colony estate, and which is one and one-fifth miles long has been converted into a well-built macadam road at a cost of $10,894. The work was planned and supervised by the State engineer and done under contract.

Eight hundred dollars was recently spent in providing more steam power in the brick yard for driving machinery. The colony's output of bricks is worth anywhere from $2500 to $3500 a year, net 350,000 to 400,000 being made.

On account of the natural resources of the place in the way of building stone, sand, epileptic labor, and team work, the colony undertook to do $32,000 worth of work last summer by day labor. The result was a saving of $10,000 on the cost of the same work, had it been done by contract. But it entailed an enormous amount of extra work by the superintendent and

administrative force, since every stick of lumber and all building supplies were bought under competitive bids.

A disastrous storm on June 14 last damaged the farm and the garden to the extent of $4000.

NORTH CAROLINA.—*State Hospital, Raleigh.*—Since the last report there has been added to the hospital another building of 100 rooms for male patients.

PENNSYLVANIA.—*State Hospital for the Insane, Norristown.*—A number of new buildings are being erected at the present time; two new ward buildings holding 250 patients each, one for men and one for women, are about completed. They are designed to care for feeble and untidy patients, giving them the advantage of an extra amount of light and air. Also a new chapel and amusement hall, a convalescent building for men and a nurses' home for men.

Within the past six months there has been no change in the methods of administration of this hospital.

On July 10, 1908, three large barns on the farm were burned to the ground; the cause of the fire has never been ascertained. Some claim that a patient had set the buildings afire, while others stated that it was due to spontaneous combustion, from the presence of a large quantity of new hay in the barn.

—*Philadelphia Hospital for the Insane, Philadelphia.*—In the early part of the year the room connected with the infirmary was renovated and equipped as an operating and dressing room; a graduate nurse from the Philadelphia General Hospital was placed in charge, and graduate nurses have also been placed in charge of the male infirm wards. The success of this change was pronounced from the start.

At the beginning of the year a small pathological laboratory for special work connected with this department was started and an experienced pathological assistant was secured from the William Pepper Laboratory connected with the University of Pennsylvania for the section work and staining. The resident physicians have in this way been encouraged in their original and scientific work.

The farm purchased last year, consisting of 875 acres and some 14 buildings, has given employment to a large number of patients during the year. This farm is situated some 18 miles from the institution and has been a great benefit not only as a farm, but as a relief to the crowded condition of the institution. The relief from overcrowding has undoubtely been a factor in the general increase of the health of the patients. In former years there was always a large percentage of dysentery cases during the summer months, while this summer but two cases developed.

Two large pavilions were renovated so as to accommodate the noisy and unclean bed patients, and this has been a great relief to the sick wards.

—TEXAS.—*State Lunatic Asylum, Austin.*—During the past year an addition to the colored department has been erected at this institution to accommodate 200 patients. The buildings complete cost the State $25,000.

—*Epileptic Colony, Abilene.*—At present there are 272 patients here, with room just completed for 80 more. There are on file 400 applications for admission.

The patients are cared for with open doors and all who are not insane and many of those who are insane and harmless are permitted to walk about the farm when not engaged in some kind of work.

A happy combination of work and play seems to afford the best method of managing these peculiarly afflicted people.

An ample supply of vegetables and fruit has been supplied from the colony gardens all summer.

VIRGINIA.—*Central State Hospital, Petersburg.*—(The following was received too late for insertion in the April Summary).—An unusually large number of senile dements, many pre-senile, was admitted during the fiscal year ending September 30, 1907. There was also a noticeable increase in the number of cases suffering from tuberculosis, venereal diseases, and alcoholism. These facts suggest physical, mental, and moral deterioration of the race. There were admitted last year 368 patients, the total number treated being 1592. There are now in the institution 1280.

During the spring and summer a pavilion or cottage, especially designed for tuberculous cases, will be built at a convenient elevation, to which all the female cases of this class will be transferred and treated strictly according to modern ideas. For some years past all the consumptives at this hospital have been segregated in either tents or inexpensive pavilions. No tubercular patients are permitted to mingle with other patients or occupy rooms on the wards.

The colonies for the male tubercular cases and out-door class, each located about a mile from the main plant, will be further improved and later enlarged. The colony plan is regarded with special favor here.

As usual, during the college vacation several medical students or young graduates will be given positions in the medical department, to aid the regular staff of assistants. Further improvement has been planned in the pathological department, to be made as soon as a competent man has been secured.

The legislature now in session has passed several important bills affecting the public care of the insane and epileptics. The law requiring the insane persons who are financially able to do so, to pay for their care in the State institutions, has been repealed, all now being free patients.

A bill has been passed providing for a State board of charities and correction with advisory functions. This is a most excellent move in the interest of charitable and correctional institutions and their inmates. It emanated from the Conference of Charities and Correction.

An institution for epileptics—a colony—is now an assured fact. The legislature has appropriated $20,000, which, in addition to the amount appropriated two years ago, will be sufficient to establish the colony on a small plan and as a branch to one of the existing hospitals for the insane. It will be located in the Piedmont section. In the near future it will evidently be conducted as a separate and distinct institution. In 1894, Dr. W. F. Drewry, superintendent of this hospital, initiated the move in Virginia for an epileptic colony, and has kept the matter constantly before the public, the medical societies, the boards of the insane hospitals, the legislature, etc., thereby creating and encouraging public interest in it, until success came.

ONTARIO.—*Rockwood Hospital, Kingston.*—Gradually the various services and methods of treatment are being improved and perfected. The night service has at last been brought into harmony with modern hospital ideals, three night nurses having been appointed in both the male and female departments, and two experienced supervisors have been placed in charge, to direct the nursing; this makes the service quite complete, and thorough nursing is being carried out. The effect on the whole institution is quite remarkable. Heretofore disturbed patients had not that attention and supervision during the night that good nursing demands. It was sometimes necessary to administer chemical restraint, and to leave them in guarded rooms, when they became so violent as to disturb the other patients in the same dormitory.

The administration of hypnotics has been done away with almost entirely. When a patient becomes disturbed or restless he is given nursing and nourishment. It is quite remarkable to witness the soothing effect of the administration of even a glass of hot milk. The continuous baths are now in service at night as well as during the day. It has been found that in some cases the cold pack will induce sleep when the hot pack and prolonged bath have both failed.

The number of filthy patients has been reduced very much. It is hoped that with improved night service, the incoming patients can be so trained that this dreaded abomination may be eliminated. The destructive patients too have been markedly reduced. Care, watchfulness, and nursing can do much. It is safe to say that salvage will almost balance the increased cost of the improved service.

The continuous baths installed in this institution some two years ago are giving good satisfaction. There being four tubs now in constant use, and it is expected to install four more before the close of the present year. The cases that are given this treatment are carefully selected, and include all acute cases in which any evidence of a toxic condition may appear, including especially cases of dementia præcox (katatonic type), manic depressive insanity, epileptics during the post-epileptic frenzy, intoxication psychoses (alcohol and morphine), and excited noisy senile dements. Ex-

cellent results are achieved by simply keeping the patients in the continuous baths about 10 to 12 hours a day, carefully looking after their extra diet, and paying strict attention to their excreta. The temperature of the baths is kept between 94° and 98°. F.

The effect of these baths is simply astonishing in some cases, noisy, violent, resistive and destructive patients often quieting down and falling asleep before they have been an hour in the bath, and the periods of excitement being very much shortened.

In some patients, whose skins are oily and giving off a heavy, foul smelling odor, it is found that a few days' treatment makes the skin clean and smooth, and the foul odor is eliminated.

A good many complaints have been made by different institutions of difficulty in maintaining a regular even temperature, especially where the water comes direct from the pipes which supply the various water sections of the institution. This difficulty has been obviated in this hospital by connecting the pipes near the main hot and cold water tanks, and putting a circulator on the hot water pipe. Some difference in the reading of the thermometers on the mixing tanks and the thermometers in the bath tub is noticed, this amounting generally to between 2° and 3°. The method of having the feed water equally distributed over the whole surface of the bottom of the tub, by a perforated coil is much superior to the system in which feed water comes in at one point near the middle of the tub; the water is better mixed and distributed, and the danger of scalding the patient made almost impossible.

As soon as patients show any symptoms of weakness or cyanosis, they are removed from the bath. For a lubricant to the skin to prevent maceration olive oil is used, which answers the purpose better than mutton-tallow or lard. Each patient, on removal from the bath, is carefully dried, given an alcohol rub and put to bed.

During the past year the institution has been equipped with a system of hot air baths, which provide a convenient means of meeting many of the therapeutic indications of the continuous bath. Though, as a sedative influence over very disturbed patients it is decidedly inferior to the latter, yet experience indicates that by its employment many attacks of excitement and depression have been prevented or aborted, and that it is an efficient agent for freeing the system of morbid products and other toxic substances. Its value appears to consist mainly in the increased tissue changes which take place under the elevated temperature, and the active elimination of their end products through the skin.

Some patients respond very feebly to the first few baths, but the amount of perspiration increases as the baths are used from day to day. There is almost invariably a considerable loss of weight, due to the increased metabolism, on this account these patients should receive an abundance of nourishment, especially liquids, and the bath room should be well ventilated to provide the necessary supply of oxygen.

Needless to say, these baths should be given only under the supervision of intelligent nurses, who must exercise constant vigilance over the patient and the thermometer.

In the month of August, 1908, a complete electro-therapeutic apparatus was installed, but it is too early to make any report as to its therapeutic value.

The pathological laboratory has been fully equipped with all the necessary apparatus for the carrying out of special pathological work, not only on the various excreta and fluids of the body, but also with the necessary microtomes, microscopes, and staining re-agents for the study of the brain and cord and other body tissues.

Dr. William Gibson will be associated with Dr. W. T. Connell in the pathological and other laboratory work.

Another beneficent change has been made. The grounds are large, and the nursing, as far as possible, has been conducted outside. This summer all the patients, except the acute cases and those undergoing special treatment, were removed to the grounds. It is a happy departure. The patients enjoy it. There is rest for the nurses and attendants. The acute cases and those undergoing special treatment are left undisturbed, and the obnoxious hospital odor has all but departed.

For the further beautification of the grounds, a new conservatory is being constructed. It will be the most modern in Ontario. It will be possible to obtain flowers and plants for the sick rooms, and also add fresh beauty to the park and gardens.

—*Asylum for the Insane, Penetanguishene.*—This institution, until four years ago, was a reformatory for boys, but was then converted into an asylum for the insane, and as accommodation was provided, consignments of patients from the other provincial asylums were sent here under Doctor Spohn as superintendent, until the place has now a population of nearly 400. To make accommodation for these many changes had to be made, one of the principal of which was the conversion of an old building which had been partially destroyed by fire, into a ward for the men, and at present 121 men are housed there. The main building has been renovated and four wards made for females exclusively. These wards are very comfortable for the class of patients kept, and the whole place will afford the government an opportunity to relieve the other overcrowded institutions of the province.

Very great changes in conveniences about the place were rendered necessary by this increase of population. A new boiler room had to be built and new boilers installed, and there is now building a coal vault 80 x 50 x 12 feet. This will be a great convenience, especially if, as is suggested, a wire rope and bucket system is installed for conveying the coal from the dock up the hill to the vault.

A new bakery had to be built, also several other necessary buildings. The situation, as far as beauty and sanitation is concerned, is ideal, and

in the future the institution will grow and be considered one of the best in the province as a quiet, healthful resort for the mentally afflicted.

The staff is now composed of Dr. G. A. MacCallum, late of London Asylum, as superintendent, and Dr. J. C. Cattermole as assistant physician. There are 12 male attendants and 12 nurses now in the service.

Nova Scotia.—*Nova Scotia Hospital, Halifax.*—Early in February last the main chimney was struck by lightning and badly damaged. Falling bricks crashed through the roof of the boiler house, damaging it considerably. The most serious destruction was suffered by the water mains, of which there are two. These were both shattered for a considerable distance, so that the water supply failed completely. As the ground was frozen, much difficulty was experienced in repairing the mains, and for nearly 48 hours the hospital was without water for steam purposes, and consequently without heat. During a part of this time the weather was very cold, and the heating pipes and plumbing, in places, became frozen and burst. The total damage amounted to several thousand dollars.

This accident has hastened an undertaking which has been under consideration for some time, viz.: the removal of the power plant to a more convenient situation at the wharf. The wharf has been enlarged, and a new power building is now under construction, which will be newly equipped throughout. In addition to boilers and electric plant it will contain a powerful fire pump.

A new laundry building is now under construction, and will shortly be completed. The wash room, equipped with new washers, extractors, dry rooms, etc., is now in operation, and the other departments will be ready for occupation in October.

Arrangements have been completed for the replacement of the present heating system by a new fan system. The Canadian Buffalo Forge Company have contracted to erect the fans, etc., and the system will be in at least partial operation in November.

It is planned to remodel the present boiler house and convert it into a kitchen, for which purpose it is admirably situated.

A plot of land to the north of the hospital property has just been acquired, which will make possible a very considerable improvement of the grounds.

Appointments, Resignations, Etc.

ACHUCARRO, DR. NICHOLAS, of Bilbao, Spain, appointed in charge of histopathological research at Government Hospital for the Insane at Washington, D. C.

AITKEN, DR. C. STANLEY, appointed Clinical Assistant at Philadelphia Hospital for the Insane at Philadelphia, Pa., Sept. 1, 1908.

ALLEN, DR. CHARLES L., Pathologist and Second Assistant Physician at New Jersey State Hospital at Trenton, resigned to enter private practice in Los Angeles, Cal.

APPERSON, DR. JOHN S., formerly Assistant Physician at Southwestern State Hospital at Marion, Va., died suddenly Aug. 8, 1908, aged 64.

BAILEY, DR. ALEXANDER, Superintendent of Kentucky State Institution for Feeble-Minded at Frankfort, resigned.

BAKER, DR. LEONARD, Junior Assistant Physician at State Asylum for Insane Criminals at Bridgewater, Mass., promoted to be First Assistant Physician.

BALLARD, DR. HARRY E., formerly Assistant Physician at Vermont State Hospital for the Insane at Waterbury, died June 11, 1908, aged 35.

BARRETT, DR. F. ELIZABETH, Assistant Physician at Michigan Asylum for Insane at Kalamazoo, resigned January 1, 1908, to enter private practice.

BARROWS, DR. H. C., Medical Interne at Maine Insane Hospital at Augusta, appointed Assistant Physician at Colony for the Insane at Gardner, Mass.

BAXTER, DR. T. L., Assistant Physician at Athens State Hospital at Athens, O., resigned.

BISHOP, DR. LESLIE C., appointed Assistant Physician at Danvers State Hospital at Hathorne, Mass., April 8, 1908.

BLACK, DR. EDWARD H., formerly Superintendent of State Institution for Feeble-Minded at Frankfort, Ky., died April 5, 1908, of senile debility, aged 88.

BLAIR, DR. E. SCOTT, appointed Superintendent of Southern State Hospital at Patton, Cal.

BOWERS, DR. WALTER G., Assistant Physician at Philadelphia Hospital for the Insane at Philadelphia, Pa., resigned Sept. 15, 1908, to enter private practice.

BRADLEY, DR. ISABEL, Assistant Physician at Columbus State Hospital at Columbus, O., resigned.

BRICKER, DR. ELIZABETH B., Assistant Physician at Philadelphia Hospital for the Insane at Philadelphia, Pa., resigned Sept. 1, 1908.

BROWN, DR. GORDON T., Assistant Physician at Danvers State Hospital at Hathorne, Mass., resigned April 1, 1908, to enter private practice.

BROWN, DR. JUDSON F., appointed Medical Interne at Gowanda State Homeopathic Hospital at Gowanda, N. Y.

BRUNDAGE, DR. HOWARD, Medical Interne at Columbus State Hospital at Columbus, O., promoted to be Assistant Physician.

CARRIEL, DR. HENRY F., formerly Superintendent of Illinois Central Hospital for the Insane at Jacksonville, died June 23, 1908, aged 77.

CASAMAJOR, DR. LOUIS, Medical Interne at Manhattan State Hospital at Ward's Island, N. Y., resigned August 23, 1908.

CHANEY, DR. EUGENE, Assistant Physician at Mendota State Hospital at Mendota, Wis., appointed First Assistant Physician at Milwaukee Sanitarium at Wauwatosa, Wis.

CHRISTAL, DR. JAMES F., formerly Assistant Physician at State Hospital for the Insane at Agnews, Cal., died June 11, 1908, aged 54.

CLAYTON, DR. JOHN C., appointed Medical Interne at Manhattan State Hospital at Ward's Island, N. Y., May 20, 1908.

COBLE, DR. MORRIS, appointed Medical Interne at Kings Park State Hospital at Kings Park, N. Y., September, 1908.

COFFIN, DR. HARRIET F., Woman Physician at Central Islip State Hospital at Central Islip, N. Y., appointed Junior Physician at Kings Park State Hospital at Kings Park, N. Y., May, 1908.

CONSER, DR. M. EDITH, Medical Interne at Government Hospital for the Insane at Washington, D. C., promoted to be Junior Assistant Physician, October 1, 1908.

COWEN, DR. MELVIN E., appointed Assistant Physician at Massachusetts Hospital for Epileptics at Palmer, September, 1907.

CRANE, DR. JAMES W., appointed Interne at Eastern Maine Insane Hospital.

CRISLER, DR. JULIUS, Assistant Physician at Mississippi State Insane Hospital at Jackson, resigned.

DARNALL, DR. M. H., Medical Interne at Government Hospital for the Insane at Washington, D. C., resigned January 31, 1908, to enter private practice.

DAVIS, DR. FRED W., Assistant Physician at Department for Men, State Hospital for the Insane at Norristown, Pa., resigned October 1, 1908, to enter private practice.

DICKINSON, DR. EVELYN, appointed Assistant Physician at Department for Women, State Hospital for the Insane at Norristown, Pa., October 1, 1908.

DOUGHERTY, DR. STEWART M., Third Assistant Physician at Napa State Hospital at Napa, Cal., promoted to be Second Assistant Physician.

ELLIOTT, DR. ALFRED, Senior Assistant Physician at State Asylum for Insane Criminals at Bridgewater, Mass., for four years, resigned May 1, 1908, to enter private practice.

EMERSON, DR. ADELE R., Assistant Physician at Northern Hospital for Insane at Logansport, Ind., resigned January 28, 1907.

EVANS, DR. MARY L., Assistant Physician at Department for Women, State Hospital for the Insane at Norristown, Pa., resigned October 1, 1908, to take a three months' trip abroad and then enter private practice.

FEREBEE, DR. EDWIN B., Second Assistant Physician at State Hospital for the Insane at Raleigh, N. C., resigned.

FERGUSON, DR. RAY, Superintendent of Territorial Asylum for the Insane at Phoenix, Ariz., resigned.

FOLSOM, DR. RALPH P., appointed Medical Interne at Manhattan State Hospital at Ward's Island, N. Y., June 2, 1908.

FRARY, DR. LOUIS M., appointed Third Assistant Physician at Napa State Hospital at Napa, Cal.

FUNKHOUSER, DR. EDGAR B., Third Assistant Physician at New Jersey State Hospital at Trenton, promoted to be Second Assistant Physician.

GARDINER, DR. THOMAS W., appointed Superintendent of Central Kentucky Asylum for the Insane at Lakeland.

GARTEN, DR. FRANK, appointed Medical Interne at Willard State Hospital at Willard, N. Y., June 1, 1908.

GEHRINGER, DR. GEORGE M., appointed Medical Interne at Government Hospital for the Insane at Washington, D. C.

GEORGE, DR. J. C., appointed Assistant Physician at Columbus State Hospital at Columbus, O.

HALLADJIAN, DR. H. I., appointed Assistant Physician at Danvers State Hospital at Hathorne, Mass., September 1, 1908.

HAMBROOK, DR. AUGUSTUS J., appointed Medical Interne at Willard State Hospital at Willard, N. Y., July 1, 1908.

HAMMOND, DR. FREDERICK A., appointed Fourth Assistant Physician and Pathologist at New Jersey State Hospital at Trenton.

HANES, DR. E. L., Assistant Physician at Rochester State Hospital at Rochester, N. Y., resigned to enter private practice in Rochester, N. Y.

HARRIS, DR. WILLIAM A., Medical Interne at Binghamton State Hospital at Binghamton, N. Y., promoted to be Assistant Physician.

HAZELWOOD, DR. JAMES F., Interne at Erie County Hospital at Buffalo, N. Y., appointed Medical Interne at Buffalo State Hospital at Buffalo, N. Y.

HEALEY, DR. DANIEL J., appointed Pathologist to Eastern Kentucky Asylum for the Insane at Lexington.

HEALEY, DR. LOUISE, appointed Third Assistant Physician at Eastern Kentucky Asylum for the Insane at Lexington.

HEITZGER, DR. JOSEPH D., appointed Assistant Physician at Michigan Asylum for the Insane at Kalamazoo June 29, 1908.

HERRING, DR. ARTHUR P., appointed Secretary of the Lunacy Commission of Maryland.

HOLMBERG, DR. CARL E., appointed Assistant Physician at Michigan Asylum for the Insane at Kalamazoo, September 10, 1908.

HOOK, DR. HARRIET, Assistant Physician at Illinois Institution for Feeble-Minded Children at Lincoln, resigned.

HORSMAN, DR. H. L., Second Assistant Physician at Maine Insane Hospital at Augusta, promoted to be First Assistant Physician.

HUMMER, DR. H. R., of Government Hospital for the Insane at Washington, D. C., appointed Superintendent of the Government Hospital for Insane Indians at Canton, So. Dak., to take charge October 1, 1908.

HUTCHINSON, DR. MARCELLO, formerly Superintendent of Vermont State Hospital for the Insane at Waterbury, died April 21, 1908, after an illness of three years.

ISHAM, DR. MARY, appointed Assistant Physician at Columbus State Hospital at Columbus, O.

JOHNSON, DR. H. O., Assistant Physician at Hartford Retreat at Hartford, Conn., resigned December, 1907.

KANAGA, DR. EBEN D., appointed Assistant Physician at Michigan Hospital for the Insane at Kalamazoo.

KATZENELLENBOGEN, DR. EDWIN, appointed Assistant Physician at Danvers State Hospital at Hathorne, Mass., January 15, 1908.

KEELER, DR. JOHN J., Medical Interne at Manhattan State Hospital at Ward's Island, N. Y., resigned April 4, 1908.

KELLER, DR. CORLISS, appointed First Assistant Physician at Longview Asylum at Carthage, O.

KENDIG, DR. WILLARD, First Assistant Physician at Longview Asylum at Carthage, O., resigned.

KETCHERSIDE, DR. J. A., appointed Superintendent of Territorial Asylum for the Insane, at Phoenix, Ariz.

KIRBY, DR. GEORGE H., Assistant Physician at Manhattan State Hospital at Ward's Island, N. Y., promoted to be Director of Clinical Psychiatry May 1, 1908.

LAKE, DR. LAFAYETTE, Medical Interne at Manhattan State Hospital at Ward's Island, N. Y., resigned May 1, 1908.

LAURIE, DR. THOMAS F., appointed Medical Interne at Matteawan State Hospital at Fishkill, N. Y.

LEONARD, DR. EDWARD, appointed Clinical Assistant at Philadelphia Hospital for the Insane at Philadelphia, Pa., April 24, 1908, and promoted to be Assistant Physician, September 1, 1908.

LETCHER, DR. BENJAMIN, formerly Superintendent of Western Kentucky Asylum for the Insane at Hopkinsville, died July 13, 1908, from cerebral hemorrhage, aged 76.

LOOMIS, DR. CAROLINE A., appointed Assistant Physican at State Lunatic Asylum at Austin, Texas.

LYON, DR. CHARLES G., Assistant Physician at Binghamton State Hospital at Binghamton, N. Y., resigned July 1, 1908, to take charge of a private sanitarium.

MCCARTY, DR. PAUL D., Assistant Physician at Michigan Asylum for the Insane at Kalamazoo, resigned March 20, 1908, to accept a more lucrative position in another State.

McTiernan, Dr. James, appointed Medical Interne at Kings Park State Hospital at Kings Park, N. Y., August, 1908.

Macdonald, Dr. J. B., Assistant Physician at Maine Insane Hospital at Augusta, appointed Assistant Physician at New Hampshire State Hospital at Concord, in charge of the new psychiatric wards.

Magwood, Dr. S. J. Newton, appointed Medical Interne at Buffalo State Hospital at Buffalo, N. Y., February, 1908, and resigned September 1, 1908, to enter private practice in Toronto, Ontario.

Mebane, Dr. Wm. N., Medical Interne at Government Hospital for the Insane at Washington, D. C., resigned July 16, 1908, to enter private practice at Hillsboro, N. C.

Meder, Dr. Florence, transferred to Central Kentucky State Asylum at Lakeland as Third Assistant Physician.

Meyer, Dr. Adolf, Director of Pathological Institute of New York State Hospitals, appointed Professor of Psychiatry at Johns Hopkins University, Baltimore, and Director of the new Phipps Psychiatric Clinic.

Meyer, Dr. William B., appointed Assistant Physician at Michigan Asylum for the Insane at Kalamazoo June 10, 1908.

Miller, Dr. Henry W., Psychopathologist at Cook County Institutions at Dunning, Ill., appointed Clinical Director at Government Hospital for the Insane at Washington, D. C., September 3, 1908.

Mitchell, Dr. George W., First Assistant Physician at Illinois State Insane Hospital at Peoria, has been granted a year of absence for rest and study.

Munson, Dr. J. F., Resident Pathologist at Craig Colony at Sonyea, N. Y., returned from Europe in July after six months spent in scientific work, mostly in Germany.

Myles, Dr. Charles G., appointed Junior Assistant Physician at State Asylum for Insane Criminals at Bridgewater, Mass., June 1, 1908.

Newell, Dr. Everett G., appointed Superintendent of Oklahoma Hospital for the Insane at Fort Supply.

Nickerson, Dr. M. A., appointed Medical Interne at Rochester State Hospital at Rochester, N. Y.

Nuttall, Dr. W. L., appointed Superintendent of Kentucky State Institution for Feeble-Minded at Frankfort.

Ogden, Dr. George W., Fifth Assistant Physician at Napa State Insane Hospital at Napa, Cal., resigned.

Palmer, Dr. Earl, appointed Junior Assistant Physician at Northern Hospital for Insane at Logansport, Ind., February 18, 1907, and promoted to be Assistant Physician June 1, 1907.

Parady, Dr. Lewis, Interne at Eastern Maine Insane Hospital, has completed his service of one year.

Peck, Dr. Ellery M., appointed Clinical Assistant at Manhattan State Hospital at Ward's Island, N. Y., April 27, 1908, and resigned July 6, 1908.

Perkins, Dr. Anne E., Medical Interne at Gowanda State Homeopathic Hospital at Gowanda, N. Y., promoted to be Woman Physician.

Pershing, Dr. Cyrus L., appointed Clinical Assistant at Manhattan State Hospital at Ward's Island, N. Y., July 1, 1908, and promoted to be Medical Interne August 23, 1908.

Picot, Dr. L. Julian, appointed Second Assistant Physician at State Hospital for the Insane at Raleigh, N. C.

Pierson, Dr. S. A., appointed Laboratory Assistant at Rochester State Hospital at Rochester, N. Y.

Pillsbury, Dr. L. B., Pathologist at Nebraska Hospital for the Insane at Lincoln, is at present in Vienna, taking a course in cerebral pathology and psychiatry, and will be away about four months.

Pitman, Dr. M. W. H., Junior Assistant Physician at Worcester Insane Hospital at Worcester, Mass., promoted to be Assistant Physician January 1, 1908.

Porter, Dr. William C., appointed Medical Interne at Hudson River State Hospital at Poughkeepsie, N. Y.

PRESTON, DR. GEORGE J., Secretary of the Lunacy Commission of Maryland, and Professor of Physiology and Nervous Diseases of the College of Physicians and Surgeons of Baltimore, died June 17, 1908, aged 49.

RAUGH, DR. HARVEY M., Junior Assistant Physician at Hartford Retreat at Hartford, Conn., resigned to enter private practice.

REDWINE, DR. JOHN S., Superintendent of Eastern Kentucky Asylum for the Insane at Lexington, resigned.

REED, DR. RALPH G., Interne at State Hospital for the Insane at Howard, R. I., appointed to the staff of Central Islip State Hospital at Central Islip, N. Y., August, 1908.

ROBERTS, DR. JAMES D., formerly Superintendent of Eastern State Hospital for the Insane at Goldsboro, N. C., died June 14, 1908, aged 56.

ROGERS, DR. JOSEPH, for 20 years Superintendent of Northern Hospital for the Insane at Logansport, Ind., died April 11, 1908, of tubercular pyelo-nephritis and cystitis, aged 67.

ROLLER, DR. W. C., appointed Clinical Assistant at Philadelphia Hospital for the Insane at Philadelphia, Pa., June 6, 1908, and resigned July 12, 1908.

ROSANOFF, DR. AARON J., Assistant Physician at Kings Park State Hospital at Kings Park, N. Y., promoted to be Second Assistant Physician June, 1908.

ROSENBAUM, DR. J. G., appointed Clinical Assistant at Philadelphia Hospital for the Insane at Philadelphia, Pa., November, 23, 1907, and resigned to be Assistant Bacteriologist in the Bureau of Health, Philadelphia, June 22, 1908.

ROSS, DR. JOHN, appointed Medical Interne at Kings Park State Hospital at Kings Park, N. Y., July, 1908.

ROWLAND, DR. G. A., appointed Medical Interne at Columbus State Hospital at Columbus, O.

RYAN, DR. WILLIAM J., appointed Medical Interne at Middletown State Homeopathic Hospital at Middletown, N. Y., July 1, 1908.

SANDY, DR. WILLIAM C., Fourth Assistant Physician at New Jersey State Hospital at Trenton, promoted to be Third Assistant Physician.

SCHLEY, DR. ALICE E., Woman Physician at Gowanda State Homeopathic Hospital at Gowanda, N. Y., resigned September 1, 1908.

SCHLEY, DR. R. MONTFORT, Assistant Physician at Gowanda State Homeopathic Hospital at Gowanda, N. Y., resigned September 1, 1908.

SCHNEIDER, DR. CARL VON A., Junior Physician at Gowanda State Homeopathic Hospital at Gowanda, N. Y., promoted to be Assistant Physician.

SHEA, DR. JAMES J., Medical Interne at Kings Park State Hospital at Kings Park, N. Y., transferred to Manhattan State Hospital at Ward's Island, N. Y., September 4, 1908.

SHEEP, DR. WILLIAM L., Medical Interne at Government Hospital for the Insane at Washington, D. C., promoted to be Junior Assistant Physician April 1, 1908.

SHERMAN, DR. JEANETTE H., Assistant Physician at Department for Women, State Hospital for the Insane at Norristown, Pa., resigned October 1, 1908, to enter private practice at Ridley Park, Pa.

SHROEDER, DR. MARIE C., appointed Junior Physician at Kings Park State Hospital at Kings Park, N. Y., May, 1908.

SICHERMAN, DR. HARRY, appointed Medical Interne at Government Hospital for the Insane at Washington, D. C.

SMITH, DR. LUCIAN C., Special Attendant at Government Hospital for the Insane at Washington, D. C., resigned to be Assistant Surgeon at National Home for Disabled Volunteer Soldiers at Hampton, Va.

SPRATLING, DR. W. P., Medical Superintendent at Craig Colony at Sonyea, N. Y., resigned to be Professor of Nervous Diseases and Physiology at College of Physicians and Surgeons at Baltimore, Md., his resignation taking effect November 30, 1908.

STEFFIAN, DR. ALICE, Assistant Physician at Department for Women, State Hospital for the Insane at Norristown, Pa., resigned July 11, 1908, on account of ill health.

STEPHENS, DR. JAMES W., Superintendent of Central Kentucky Asylum for the Insane at Lakeland, resigned.

STICE, DR. TYRE H., Second Assistant Physician at Napa State Hospital at Napa, Cal., resigned.

STURGIS, DR. KARK B., appointed Interne at Maine Insane Hospital at Augusta, for one year.

SULLIVAN, DR. GEORGE F., appointed Junior Assistant Physician at Worcester Insane Hospital at Worcester, Mass., July 15, 1907.

SWALLOW, DR. FRANK W., appointed Clinical Assistant at Philadelphia Hospital for the Insane at Philadelphia, Pa., July 13, 1908.

SWINDELL, DR. WALTER L., appointed Interne at State Hospital for the Insane at Howard, R. I.

TAPPAN, DR. PAUL W., Assistant Physician at Dayton State Hospital at Dayton, O., resigned.

TAYLOR, DR. ELVIN C., appointed Clinical Assistant at Manhattan State Hospital at Ward's Island, N. Y., May 15, 1908, and resigned June 23, 1908.

TAYLOR, DR. HARRY ALLEN, appointed Acting Pathologist at Nebraska Hospital for the Insane during the absence of Dr. Pillsbury.

TAYLOR, DR. WALTER A., appointed Fifth Assistant Physician at New Jersey State Hospital at Trenton.

TERFLINGER, DR. FREDERICK W., Senior Assistant Physician at Northern Hospital for Insane at Logansport, Ind., promoted to be Medical Superintendent July 17, 1908.

THOMPSON, DR. WILLIAM J., appointed Medical Interne at Binghamton State Hospital at Binghamton, N. Y.

THOMSSEN, DR. W. HERBERT, appointed Clinical Assistant at Philadelphia Hospital for the Insane at Philadelphia, Pa., August 12, 1908.

TOBEY, DR. HENRY A., Superintendent of Toledo State Hospital for the Insane at Toledo, O., died suddenly August 18, 1908, of heart disease, aged 56.

VENN, DR. CLEMENT, formerly Superintendent at Milwaukee County Insane Hospital at Wauwatosa, Wis., died March 23, 1908, from nephritis, aged 40.

WALKER, DR. J. J., Assistant Physician at Danvers State Hospital at Danvers, Mass., resigned March 1, 1908.

WALKER, DR. W. H., appointed First Assistant Physician at Hartford Retreat at Hartford, Conn.

WHITNEY, DR. R. L., Junior Assistant Physician at Worcester Insane Hospital at Worcester, Mass., promoted to be Assistant Physician January 1, 1907.

WIDDOP, DR. MARY L., appointed Assistant Physician at Northern Hospital for Insane at Logansport, Ind.

WILLETTS, DR. DAVID G., Medical Interne at Government Hospital for the Insane at at Binghamton, N. Y.

WILDER, DR. RALPH S., Assistant Physician at Medfield Insane Asylum at Harding, Mass., was found dead in his room, April 15, 1908, from effects of a gunshot wound of his head, supposed to have been self-inflicted while despondent from ill health, aged 30.

WILLETTS, DR. DAVID G., Medical Interne at Government Hospital for the Insane at Washington, D. C., resigned December 31, 1907, to be Pathologist at Georgia State Sanitarium at Milledgeville, Ga.

WILLIAMSON, DR. A. P., Superintendent of Southern State Hospital at Patton, Cal., resigned.

WILLIS, DR. ROBERT L., appointed Superintendent of Eastern Kentucky Asylum for the Insane.

WISEMAN, DR. JOHN I., appointed Medical Interne at Kings Park State Hospital at Kings Park, N. Y., July, 1908.

WRIGHT, DR. ALLEN H., Medical Interne at Willard State Hospital at Willard, N. Y., resigned to enter private practice May 5, 1908.

ZIEGLER, DR. GEORGE, appointed Clinical Assistant at Philadelphia Hospital for the Insane at Philadelphia, Pa., and resigned to be Acting Assistant Surgeon, U. S. N., April 1, 1908.